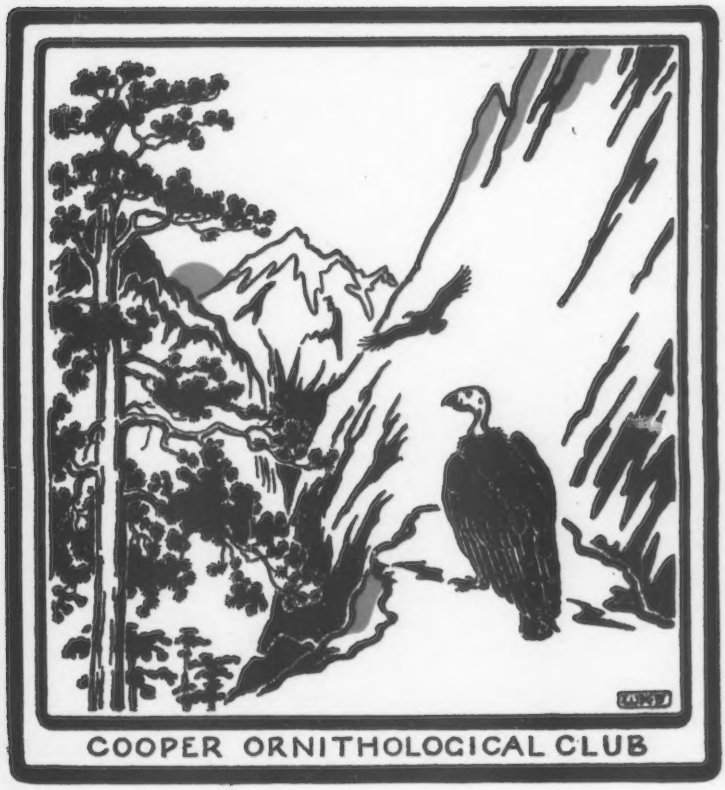
N. A. Woods.

THE CONDOR

A Magazine of Western Ornithology

Volume XLI July-August, 1939 Number 4



COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club
Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California, under Act of Congress of February 28, 1925, Section 412, paragraph 4.
Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.
Fifty Cents the single copy.
Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

The Life Membership fee is Seventy-five Dollars. No additional dues are required, and the money is invested and the interest only is used for Club publications. Life Members receive The Condor without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, Berkeley, California, or to either of the Associate Editors, JEAN M. LINSDALE and ALDEN H. MILLER, same address.

Send dues and subscriptions to JOHN McB. ROBERTSON, Associate Business Manager, Buena Park, California; orders for back numbers of THE CONDOR and the PACIFIC COAST AVIFAUNA series to W. LEE CHAMBERS, Business Manager, 2068 Escarpa Drive, Eagle Rock, California.

Issued July 15, 1939

CONTENTS

PAGE

The History of a Family of Black Phoebes (with three ills.)....*George Oberlander* 133

Fall Wanderings of Clapper Rails....*Robert T. Orr* 151

Two Fossil Birds from the Lower Miocene of South Dakota (with one ill.)....*Alden H. Miller* and *Lawrence V. Compton*.... 153

Bird Records from Utah and Arizona....*Angus M. Woodbury* 157

FROM FIELD AND STUDY

Ivory-billed Woodpecker's Beak in an Indian Grave in Colorado....*Alfred M. Bailey* 164

European Jack Snipe and Franklin Gull in California....*D. D. McLean* 164

The House Finch in the Willamette Valley, Oregon....*Kenneth Gordon* 164

Notes on the Distribution of the Lesser Canada Goose and Cackling Goose in California.... *James Moffitt* 164

"The Mississippi Kite in Spring"....*Wilson C. Hanna* 166

Old-squaw and American Scoter in San Diego Region....*William Tod Helmuth, III* 167

Some Unusual Arizona and New Mexico Bird Records....*Gale Monson* 167

Food Consumption of a Sparrow Hawk....*Leonard Wing* and *Anne Hinshaw Wing* 168

Starlings Arrive in Utah....*C. W. Lockerbie* 170

A Pacific Kittiwake Comes Inland....*Stanley G. Jewett* 170

Geographic Variation in the Fork-tailed Petrel....*J. Grinnell* and *Frederick H. Test* 170

Mountain Bluebirds Hovering....*Emerson A. Stoner* 172

Observations on the Reproductive Behavior of Great Blue Herons....*F. Wallace Taber* 172

Notes on the Salt-feeding Habits of the Red Crossbill....*Elmer C. Aldrich* 172

NOTES AND NEWS.... 174

MINUTES OF COOPER CLUB MEETINGS.... 174

Museum
Gift
8-2-39

THE CONDOR

VOLUME XLI JULY-AUGUST, 1939 NUMBER 4

THE HISTORY OF A FAMILY OF BLACK PHOEBES

WITH THREE ILLUSTRATIONS

By GEORGE OBERLANDER

My study of the Black Phoebe (*Sayornis nigricans*) was begun in August, 1937, and was continued until mid-July, 1938. Observations were made on the campus of the University of California at Berkeley, especially in Strawberry Canyon east from the Memorial Stadium to the Botanical Garden (fig. 31). Because of the scarcity of this bird on the campus, this paper is based on frequent and intensive observations of a few birds rather than on a broad comparative study of many individuals. The study was carried on with headquarters at the Museum of Vertebrate Zoology where discussions of my problem were held with Joseph Grinnell, Alden H. Miller and Jean M. Linsdale.

METHOD OF FEEDING

In fall, winter, and early spring Black Phoebes spend most of the time on convenient perches from which insects are sighted and pursued. A bird turns its head in irregular movements: up, down, tilting to one side then to the other, now and then twisting almost completely around to the rear. No rhythmical to and fro movement is evident. Instead, the direction of turning is variable and often accompanied by elongation or shortening of the neck as the bird peers to follow the flight of a passing insect, or searches some crevice above its perch. Periods of head-turning on the perch typically are followed by pursuits in which the bird darts away, snaps up an insect, and returns to the same or near-by perch to resume its watch. These flights are remarkably direct, never haphazard; each appears to be directed to a single insect in the air, on the surface of water, motionless on some leaf, or in a crevice of a wall. The periods of active foraging and resting are too regular in length to be correlated with any fluctuation in the supply of insects.

After resting awhile the bird typically assumes an "energetic attitude" as manifested by increased frequency of the *tsip* note, the more rapid downward tilting and fanning of the long tail simultaneously with each vocal response, and most conspicuously by a series of pursuit flights as if in response to increased hunger. This period lasts for about three minutes, then as if satisfied, a longer resting period again occurs. Notes and tail tilting continue but become less frequent and the tilting may change to an upward movement in which the tail rises and falls but does not fan out.

The longest rest on one perch lasted fifteen minutes; perching for even half this time was rare. Hence the flow of material into the digestive tract was relatively steady throughout the day.

Where the prey can be observed, remarkable efficiency is manifested in overtaking it. When an insect does evade the bird's charge, one or more additional attempts are sometimes necessary to end the chase; usually, however, the first attempt is successful. The grace and accuracy of this flight is especially noticeable when the bird lifts an

insect from water, with scarcely a disturbing motion except for the touch of the bill and an occasional dip of the long tail in the upward turn.

Pursuit flights are usually downward from the perch level so that most insects are taken from or within a few inches of the lawn, water, or weed patch below the perch. This downward drop is conspicuously frequent when the bird feeds, as it usually does, from a perch four to six feet high. Of 82 pursuit flights observed at random about a swimming pool in the fall, 87 per cent were directed to insects on or near the water. In the herb and grass patches, between December 30 and March 4, the directions of six groups of flights, a total of 118, were recorded in sequence of occurrence. Eighty-eight per cent were directed below the perch level; 49 per cent actually contacted the grass from which the insects were plucked. In cold weather when insects are scarce, this method of gleaning them from plants is no doubt important in maintaining the bird.

This capture of insects below the perch level seems to be correlated with their greater abundance there. Observed insects slowed down in flight when they hovered about patches of weeds and lawn. This apparently makes for ease of catching. On bright days I found it difficult to see insects when they were flying high in the glaring light, yet when they chanced to fly between me and a dark background, sighting became easier. Hence, it seems probable that the increased visibility of insects sighted below the phoebe's perch might be another factor influencing the number of flights directed downward.

A complete reversal of this flight direction came with the approach of darkness. Late in the evening a pair at the Botanical Garden moved to perches near their roosts, which were beneath the eaves of buildings. In the dim light the insects could not be sighted near the ground among the long shadows, yet hundreds were visible in the air above. Of 117 flights noted during the approach of darkness, 79 per cent were directed upward. The number of upward flights increased with increasing darkness as shown in a recorded sample of flights.

Usually no hesitation is apparent before an insect is pursued. Yet the directness of flight as well as the usual capture of but a single insect on each trip indicates that the insect is sighted from the perch rather than while flying. Where the bird feeds over a lawn, insects are sighted again and again from ten to twenty feet from the perch; the bird flies directly to the exact position on the lawn where the insect is located, plucks it up without the slightest indication of uncertainty and returns to the perch.

Where slow flying insects are numerous in the air, two insects are occasionally taken in one flight, the second presumably sighted in the air but probably after the first, since a series of insects, regardless of their abundance, never was taken without the bird returning to its perch.

When insects were scarce, on rainy days and early on cold mornings, hovering was noted over grassy areas or alongside walls. Evidently these hoverings were a means of sighting insects hidden in the tall grass. These hovering flights are not the regular method of feeding, nor does the bird regularly range away from the perch in this manner; instead, they seem to be an adaptation to unfavorable conditions where it is necessary to search out insects that can not be sighted from the perch, and less frequently for detecting insects already sighted from the perch but lost from the bird's view after flight began.

The method of searching from a perch not only enables the phoebe to locate insects with a minimum of energy, but the rejection of unsuitable species apparently occurs before leaving the perch. Common yellow cabbage butterflies (*Eurymus*) frequently were observed to pass slowly in jerky flight, unmolested, within a few feet of a phoebe.

Once, however, a bird darted out and snatched a cabbage butterfly, but after it was carried back to the perch, this apparently distasteful insect was flipped from the bill and allowed to flutter slowly away. The bird evidently had failed to distinguish this insect as undesirable. This delayed rejection of an insect until it was caught and possibly tasted was rarely observed, though it was found to occur with several other species.

In late spring and early summer the adult phoebes were observed to pass up dozens of checkered fritillary butterflies (*Argynnis*); there was not a single pursuit of this insect even though individuals passed within a few feet of the birds. These butterflies had a wingspread of more than 50 mm. and were easily caught by hand as they hesitated on leaves and blooms. The young phoebes fresh from the nest were not so selective as their parents in foraging. On three occasions the young were observed to snatch a fritillary and swallow it, gulping down the large wings as well as the body. These incidents indicate that the older birds become conditioned against this insect.

Several experiments indicated trial tasting in the older birds. A feeding perch was baited with a large queen ant (*Camponotus*). The bird returned to the perch and picked up and worked the insect in its mandibles for about ten seconds. Then the bait was cast aside as the bird left the perch to pursue another insect. I recovered the rejected insect, the abdomen smashed, but otherwise uninjured, and apparently cast aside because of its unpalatability. Similar results occurred with an angleworm and a locust. When a wasp (*Ceropoles*) was placed on the perch, the bird moved toward the bait, peered down in hesitation several inches above the wasp, then turned away from the perch as if frightened. Finally after using near-by perches for awhile, the bird seemed to lose its fear and brushed the bait away with its foot in returning to the perch. This insect was rejected by sight alone.

The majority of insects caught were small enough to be swallowed in flight. But when forms larger than the house fly were taken, the catch was carried back and tapped against the perch several times as if to smash and kill it before swallowing. In one instance the bird continued the beating and crushing for forty seconds; the insect was then dropped to the base of the post; the bird promptly landed in the grass and picked it up again to continue the manipulation until finally the prey was gulped down. On another occasion the insect, apparently a damsel fly, was squeezed and manipulated in the bird's bill for two minutes during which it was struck against the post perch at least twenty times. Finally, after the insect appeared to be crushed and broken, it was swallowed.

After catching large insects the birds exhibit noticeable preference for substantial flat perches against which they can break up their prey. Occasionally they change from a wire perch to a post while holding the insect in the bill. Most frequently, however, the flat perch is chosen without attempting to use wire perches. When feeding on small insects, this perch selectivity is not apparent; wire perches are then used as much or more than posts.

FEEDING AREAS

Although the pair observed most closely used different feeding grounds according to the season, the areas chosen always had certain features in common. Even when the male ranged from the Botanical Garden to the Stadium, feeding activities were restricted to areas which had certain features.

In the fall when the male foraged extensively about Strawberry Pool, it would sometimes remain several hours, resting and feeding in alternating periods about the cleared area surrounding the water. Even when the bird was stopping briefly en route to other areas, the activities were restricted to the opening about the pool; there was no gradual venturing into the surrounding thickets. When leaving the area, there was no

warning other than the selection of a relatively high perch. The bird would leave in direct and deliberate flight, pass over the trees and brush, and head for another cleared area such as the fenced fields about the veterinary laboratory, or the Stadium where

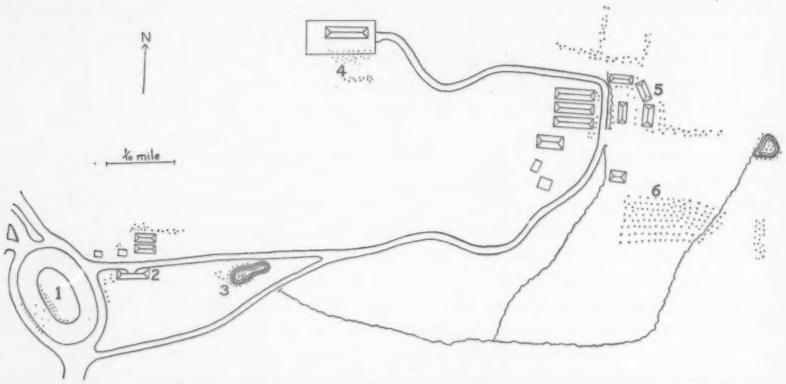


Fig. 31. Map of lower Strawberry Canyon, University of California campus, Berkeley, showing areas frequented by pair of Black Phoebes. 1, Memorial Stadium; 2, Veterinary Laboratory; 3, Strawberry Pool; 4, dairy; 5, camp buildings; 6, Botanical Gardens; stippling represents feeding areas.

the proper types of perches and clearings existed. Not only did thickets and forested areas delimit the feeding ground available to the bird, but there were also limiting factors in open grassy areas where the insect fauna was rich. In these open fields the lack of convenient perches of proper size and distribution limited the feeding ground just as rigidly as did thickets.

The peripheral part of the Stadium field was a particularly favorable feeding ground. The bird did not range over the entire field, although insects were apparently as abundant in the center as around the edges. Presumably because perches were lacking in the center, foraging was confined to a peripheral area extending from the five-foot wall a maximum of thirty feet. This wall together with the pipe railings provided convenient perches from which the phoebe could sight insects on or over the grass. To feed beyond this range was apparently impossible for the perch-sighting method of finding insects.

The bird did, however, range unrestrictedly over the bleachers, using the edges of the benches as perches and more often yet the four-foot banisters around the doorways halfway up the bowl. This area was used most frequently in the evenings before roosting and on dark rainy days when light intensity was low and skyward flights became the rule. Lack of perches was not the limiting factor in this area. The narrow open spaces between the benches greatly restricted the amount of insect-harboring surface visible to the perching bird, hence the taking of insects from the air above the perch in this area.

The walls of high campus buildings were also feeding areas, especially where perches were well-distributed beneath insect harboring ledges, as on the west Stadium wall. (See fig. 32.) Feeding in this area was observed in twenty-two out of twenty-seven evenings from January 20 to March 14. The exceptions occurred on dark, rainy days when light was poor and the bird spent excess time in the bleachers or was late in arriving at the Stadium. Even on this vertical surface the requirements of a phoebe feeding ground were easily identified. There were shelves about one foot square distributed along the wall about one-fourth the way from the top. From the edges of these shelves,

pierced in the center by flag poles, the bird peered into the crevices, grooves, and corners, which were numerous under the ledges approximately eight feet above. The corners of the shelves were used exclusively. From this position the bird could easily see into crevices eight to fifteen feet away. The factor of perch distribution was provided,

Fig. 32. Feeding area of Black Phoebe on west wall of Memorial Stadium.

since eight shelves were spaced along the wall in addition to the ledges near the top. The latter were used infrequently and mostly in movements between shelves, presumably because they exposed fewer wall crevices from the perching position than the regularly used shelves below.

The available insects were apparently largely in or near these crevices. Each flight, except for infrequent hoverings about the wall, was evidently directed from the perch to a specific insect in a crevice or less often several inches from one. Flights far out from the wall or down below the shelf to the shaded lower wall were relatively rare.

In a sample of 76 flights, 94 per cent were directed above the perch in contrast to the high percentage (88 per cent) of downward directed flights in the canyon feeding areas. The lower part of the Stadium wall below the shelf perches was rarely invaded during feeding activities since there were no perches except the banisters between arches.

The north and south walls were neglected entirely, possibly because the evening light was less intense there than on the west wall. Even on the latter where a series of

eight shelves was used in the early part of the evening, increasing darkness caused the bird gradually to narrow the range of its feeding activities to two or three shelves near the entrance to the roost.

The bird began to use the wall for briefer periods with the onset of spring until March 14 when the habit of making the long flight from the Botanical Garden was broken in favor of remaining with a newly acquired mate in the upper canyon. The roosting habit had evidently prolonged the use of the winter feeding grounds for brief evening and morning periods long after the upper canyon had come to be used exclusively during the day.

In midwinter when the open fields and garden plots of the upper canyon had turned green, certain parts of the garden and surrounding area apparently became increasingly favorable as phoebe feeding grounds, especially where perches were distributed between patches of herbs and grasses. Even before the first pairing, between January 20 and January 23, the male began to spend less time in the areas used in the fall and longer periods in the Botanical Garden and dairy, although it had not been seen in either place before December 30.

It was soon apparent that certain well-defined feeding areas were being worked to the exclusion of near-by territory. Not once was the bird observed to feed in the thick chaparral east of the garden, the thick shrubs and trees to the south, the conifer stand to the northeast, or the eucalyptus grove to the north. But, the edges of fields, the open, staked gardens, the lawns with well-spaced shrubs, the convenient wires between upper canyon buildings were occupied again and again by the foraging bird.

The bird watched for insects from a conspicuous perch. In this way it could sight insects in the air or on some herb or grass blade. These insects were readily available to the phoebe in its swooping flight. There was need of more than one perch in a given clearing as the bird worked or reworked a given area during an active period. Even the most favorably located perches were not used long without change. There was a continual progression to expose new areas or to rework areas beneath "favorite" perches.

After moving to a new perch the bird finds many new insects without using energy in flight. At the same time the previously used areas recover; insects which might have escaped the first search crawl from hiding places among the leaves and become conspicuous. Using a series of perches is more economical than the use of a single perch over a long period. For example, when the bird sights an insect ten feet straight out from a fence, the return flight is equal to the outgoing flight. If, however, the insect is sighted at a forty-five degree angle with the fence, the outgoing flight is ten feet, but the return to the nearest perch, which the bird almost invariably utilizes, is cut to seven feet, a saving of three feet. Obviously the closer the insect is to a second perch the greater saving in flight. This "short cutting" along conveniently spaced perches occurs consistently in feeding so that a series of well-spaced perches in a clearing seems to be desirable.

The birds feed over grassy fields rather than barren roadways and parking spaces or corrals of the dairy. Where a bird frequently utilized a feeding area of green grass, flights from the fence were directed almost exclusively to the grassy, insect-harboring side of the fence rather than over the barren road on the opposite side. When the pair worked the area, this preference for grass-covered foraging ground was more strikingly evident.

In the green pastures of the upper canyon, the birds moved in high, direct flights, passing over territory where perches were lacking. The telephone wires connecting the two places never were used for more than a brief rest. The birds concentrated their activities in places where buildings were available for roosting. (See fig. 31.)

The presence of streams and ponds seemed to increase the attractiveness of a feeding area. Water is generally an obvious part of the Black Phoebe's ecological niche. Certainly in the nesting season water is necessary for the mud of the nest. In the fall and winter, water surface provides variety in the insect diet. Drinking was observed but once as the bird dipped its bill into a water trough and held its head up as if to allow the water to trickle down its throat. In the late afternoon running water was used for bathing. The birds would perch near the stream, preen for a time, then fly several feet upstream, drop directly into the water, and submerge the lower breast and belly for an instant. After a prompt return to the perch, shaking and preening continued. Then the dipping would be repeated until feathers stuck together before they were rearranged in the final preening.

The feeding area used for longest periods in late winter and spring was within the Botanical Garden. Three- to four-foot stakes provided the perches; these were distributed over a 100-square-foot area, covered with green herbs and grasses. In midwinter the single bird, and later the pair, worked this area repeatedly. Fifty-four per cent of the insects were taken from the fresh green leaves, mostly of *Malva borealis*. The rounded, horizontally arranged leaves, contrasted with narrow, vertical grass blades, possibly increased visibility of insects. The gulch to the east afforded a retreat on windy days. The bare willows and buckeyes provided numerous perches on both sides of the stream there.

Even in this favorable feeding area, after an hour or so of foraging, the birds would shift to open, fenced areas, or occasionally over the shrubs and trees to the pond in the northeast corner of the Botanical Garden. This pool was surrounded by shrubs and overhanging trees and was never occupied in feeding activities as regularly as the lower canyon pool had been in the fall. The water was teeming with goldfish so that insects did not accumulate on the surface. The birds sought to catch the inch-long minnows which dimpled the water surface in the evening. They were not often observed to be successful, but daring attempts to snatch these choice morsels were made. Once, when a phoebe sighted a minnow, such a desperate attempt was made to get it that the bird dipped its head in the water nearly to the eyes. When a wiggling fish was caught, it was held in the bill, and tapped against the perch in the same manner described for large insects until finally, with gulping, the fish was swallowed.

After April 22, when incubation had begun, the feeding activities of the female were restricted to within a hundred feet of the nest. The male alone continued to move about the upper canyon. Both birds had become silent, and to follow them was difficult. When the first nest was disrupted, the pair was observed for a week again foraging together, then a new nest was started and once more the female limited her foraging to the few perches near the nest. The male continued to feed near the camp, but was not so restricted as the female until after the young hatched; then both birds remained within two hundred feet of the nest. As the insects became more abundant, the birds became more restricted in their range. There was no longer the necessity of covering the large winter and spring territory.

TERRITORIAL BEHAVIOR

The upper part of Strawberry Canyon had been occupied by phoebes in the spring of 1936 and 1937, but none was found there in the fall of 1937. This region, however, was occupied in the late winter and spring of 1938. In fourteen visits to the upper canyon after August 17 there was no sign of a phoebe until the last visit on December 30.

After a single bird first appeared, the upper canyon was frequented daily for increasingly longer periods. After February 7 the two birds of the pair that was then present spent much time in the gardens in the day, although they repeatedly left in the afternoon. By February 27 the female had started a nest, and on March 2 she roosted near it. The male did not change his roost to the upper canyon until March 14, after which the territory was occupied day and night by the pair. The territory over which the birds ranged became more and more restricted until finally they stayed within a few hundred feet of the nest site.

Because of the difficulties in catching and marking Black Phoebes, it was not possible to identify for certain the bird which frequented Strawberry Pool during the fall and early winter until the roosting site was discovered on January 20. Nevertheless, it seemed that this solitary bird which frequently remained about the pool for more than three hours at a time, using essentially the same feeding and resting perches, and moving to and from the open areas of the veterinary laboratory and Stadium, was the same individual which had been observed in this lower canyon more or less since September.

Except for the brief appearance of another bird about the pool on September 24, and again on October 10 when there were several chases, I found only one bird in Strawberry Canyon until the first pairing, on January 23.

Finding the single bird was possible in the fall and winter by my recognition of the characteristic *tsip* note given in flight. The bird rarely flew twenty feet without a series of these notes. By reason of the frequency of these utterances in flights, one could easily tell, without seeing, when the bird was in flight and when it was perching. Even while perched, the bird was rarely silent for more than a few minutes. Not until mid-April, when the territory was relatively restricted and incubation had begun, did the birds become silent and difficult to follow.

In contrast to the regularity in late winter and spring, the irregularity of the bird's presence, even in the most persistently occupied territory, in the fall and winter was noted. I found it in the lower canyon pool area eight times in fourteen visits (September 12 to October 24). In spite of the uncertainty of finding the bird, it usually remained in the area from one to three hours when found. Most of my visits were made before one o'clock; the bird usually left the area before that hour.

The flights from the pool to the Stadium and the frequent disappearance of the bird in high flight, with my subsequent failure in relocating the individual, also indicated that the phoebe ranged far in early winter. Another instance of wandering was noted near Temescal Lake, Alameda County, on December 29; this individual was observed to make a deliberate, non-stop flight extending more than five hundred yards south from the lake, where it made flights from the bare branches of a tree. After a brief feeding period it flew several hundred yards farther south, out of sight over backyards. On December 2 a Black Phoebe was moving through my yard in Berkeley, although it was observed there at no other time.

The only other phoebe observed on the campus, apart from the lower-canyon bird, was one found more or less irregularly about the Life Sciences Building; it was first reported on September 29. This bird also wandered irregularly. On one occasion it was traced from the Life Sciences Building to the Engineering Building where it remained for more than an hour. Also it moved from the Life Sciences Building to Giannini Hall, Haviland Hall, and to the main library.

In view of the evidence for considerable wandering in winter, the absence of the phoebe in the lower canyon on December 30 and the bird's presence for the first time in the Botanical Garden indicated that the lower canyon bird had extended its range to the upper canyon. In subsequent visits, lower Strawberry Canyon was unoccupied when-

ever the bird was found in the vicinity of the Botanical Garden. The inference was that this bird flew back and forth from the Botanical Garden to the Stadium.

On January 20 the bird was found as usual in the upper canyon, feeding actively until 3:30 p.m. It then selected a relatively high perch (15 feet), rested five minutes, and without further delay headed down the canyon, flying about seventy-five feet high and in a straight line. It covered approximately one-third the length of the canyon before dropping out of sight. At 4:30 p.m. apparently the same bird was found feeding about the west wall of the Stadium where it remained until 5:18. It then flew under the west-side bleachers to roost. Thereafter the bird was found on each evening's observation at this roosting place. The roosting wire was found on January 25, and with the exception of one permanent shift, the bird used the same roost each night until March 14 when the Stadium was abandoned.

Droppings and pellets beneath the roost indicated that the bird had been using it before my finding it. Since the lower-canyon bird had previously been traced to the bowl of the Stadium where it had disappeared at roosting time, and since in all later observations the bird was using the same roost, the identity of this individual became certain. To all appearances it was the bird observed in the lower canyon after September.

On January 23 in the Botanical Garden, pairing of the birds was noticed for the first time; both were fluttering in and about the nest site of the preceding year and were chasing and feeding together. A careful search found the lower canyon completely deserted. On January 26 the Stadium-roosting bird moved out from its roost and remained feeding about the Stadium; by 10:15 a.m. the mate had arrived and the pair continued feeding and chasing about the lower canyon.

The Stadium-roosting bird separated from its mate early each evening and returned to the regular roosting place; the mate always roosted elsewhere. On February 7 the pair was found in the Botanical Garden during the day; by 3:30 one of the birds had disappeared; at 4:00 the remaining individual headed down the canyon, flying approximately one hundred feet high. On February 21 the pair was feeding in the upper canyon as usual; there had been no trace of the birds in the lower canyon, although the routine of roosting had been observed there the previous evening. Both birds moved about the feeding areas of the camp and Botanical Garden from 11:30 to 1:30. Then the birds were followed as they flew across the open fields to the dairy where they remained together feeding and resting until 3:45. Now the pair separated; one flew three hundred yards to the southeast; fifteen minutes later the other bird headed farther down the canyon, flying toward the Stadium, remaining one hundred to one hundred and fifty feet high until it disappeared in the vicinity of Strawberry Pool. At 4:30 the same bird, presumably, was feeding as usual in the Stadium. With increasing regularity, in thirteen evening observations from February 23 to March 11, the bird appeared from the east, usually within a half hour of the expected time.

Also in the morning the bird left the Stadium and headed up the canyon more regularly with the onset of spring. Before February 24 there was considerable delay in leaving the Stadium and lower canyon. The bird would loaf about the Stadium until its mate arrived before moving up the canyon. In all but one of the last twelve morning visits, from February 24 to March 14, the bird moved out from the roosting wire, finished its song, hesitated a few minutes in the Stadium bowl, and headed directly up the canyon. These flights were independent of weather conditions and seemed to be dominated by a strong urge to move to where its mate resided.

The mate of the Stadium-roosting bird made its last observed appearance in the Stadium on February 22 when it remained several minutes before dusk and then flew

away. On the morning of February 28 one of the birds was building a nest beneath the eaves of a camp building in the upper canyon. Then on March 2 when the Stadium-roosting bird headed down the canyon at 5 p.m., the mate followed a few hundred yards only to return to the nest, near which it roosted for the first time.

On March 4 when the Stadium-roosting bird moved down the canyon, the mate made no attempt to follow but remained perched near the nest. The bird left the upper canyon at 5:28 p.m.; I was ready and left at the same time to arrive at the veterinary laboratory in the lower canyon at 5:30; the bird came down the canyon past my position at 5:31 and passed into the Stadium. Evidently it had paused in the swimming pool area.

The female was killed by a shot on the nest on March 10; the pair had been reported together on March 9. The excessive singing and marked irregularity in the male's roost-leaving routine on the morning after the mate had been killed seemed to be correlated with the bird's urge to acquire a new mate.

A lengthened song occurred again on the following morning, March 12, but this time the male headed directly up the canyon after leaving the Stadium. It returned again that evening and again on the evening of March 13. On the morning of March 14, after the bird had left its roost, it was found alone, singing incessantly, in the upper canyon. The bird had been reported alone in the canyon on the preceding day. On the same afternoon another Black Phoebe had replaced the dead one. Both birds were feeding in the regular areas in such typical fashion that I would never have known that a substitution had been made if the dead female had not already been found on its nest. The territory for a female phoebe had been open for three and a half to four days. It seems probable that the singing and wandering of the male contributed to this rapid replacement.

On the evening of the day that the new mate appeared, both birds for the first time roosted beneath the eaves of camp buildings in the upper canyon. The lack of a mate for several days evidently had a thwarting effect on the habitual down-canyon flight of the male. He appeared reluctant to leave the newly acquired mate and roosted near the latter in the established territory.

To confirm the evidence for the identity of this male bird, the Stadium was searched on this evening, March 14, and was found unoccupied for the first time since January 20. After this first change both birds roosted in the vicinity of the camp; except for limited flights between feeding areas in the upper canyon, they remained in their established territory.

The wandering during the pre-nesting period seems to be correlated with the need of searching extensively for food during the time of year when insects are relatively scarce. In this period many feeding areas are utilized. Although territory is not strictly defined, certain areas are used more frequently than others; the bird is solitary and wanders about more or less irregularly. After pairing and with the approach of spring the birds gradually become more localized until finally the territory becomes restricted to the surroundings of the nest site.

PELLET-CASTING

On January 26, twelve pellets composed of indigestible remains of insects were found among the droppings beneath the roost in the Stadium.

The roosting perch chosen was a horizontal telephone wire. The bird faced the wall on the west or north. It never faced the open area to the south or east, but always turned its head away from the light. Apparently the bird rarely moved along the roosting wire in the night. Only twice was there shifting after the initial roosting position had been

assumed. One time the bird moved about fourteen inches; the next time about eighteen inches.

The spherical or cone-like form, the diameter from 4 to 9 mm. (usually 7 to 8 mm.), and the absence of white material, distinguished pellets from excrement. (See fig. 33.) The droppings were elongated, white-coated, usually 2 to 3 mm. wide, and frequently consisted of little more than a white splash with a narrow, dark-colored core of fragments of insects. Under the microscope the dark portions of the excrement appeared to be the same general type of insect remains as the pellets. The fragments in the pellets had greater range of size than those in the droppings, but frequently there was no noticeable difference. The pellets contained relatively little moisture; two pellets ejected in February consisted almost entirely of insect cocoon.

Fig. 33. Pellets composed of insect remains picked up beneath roost of Black Phoebe.

Fourteen pellets contained fragmented beetle elytra (the most numerous item), femora and tibiae (including joints), parts of compound eyes, simple eyes, spurs and spines, setae, cranial parts, strings of woody material, and pubescent soft palps (entire). The color was predominently black and brown; occasionally a bright blue fragment appeared.

The bird finally changed its roost to a wire perch about fifty feet south of the first roost. The new roost was the only other wire perch in this part of the Stadium; the wire was forty feet above the stairs, approximately two feet from the ceiling, and slanted downward. Apparently the nearness of the ceiling and the great height from the stairway below lent a "feeling" of security not quite satisfied on the old perch in the presence of disturbing conditions. The numerous near-by rafters were never chosen as roosts since they afforded no perch "holds," although they were favorably located.

In the evening of February 28, which was dark and rainy, the bird faced north on the perch; the next morning it was in the same position. Even though the bird had faced in such a direction that pellets would have dropped on the stairs below, none was found there. They may have been washed or blown away, as pools of water were on the steps and the night had been windy, but more probably no pellets were regurgitated that night, since the day before had been dark, with rain in the evening, and feeding probably was restricted. Previously, during the rainy spell included in the period from February 9 to February 14, when the horizontal roost was being used, only one pellet was found in a period of five nights. In the period of rainy weather from March 2 to 12 only three pellets were found beneath the roost even though the bird had been observed to face north on the roost in each of eight observations.

Pellets then were not cast every night. The indication is that pellet-casting may be less frequent in rainy weather. The cloudy and rainy days possibly cause large, hard-shelled insects such as beetles to remain hidden during the day. As a result the phoebe not only probably gets less food, but must depend more upon the soft-bodied gnats and tiny flies which are active between showers. Great numbers of these insects apparently were taken by vertical, upward flights over the bleachers of the Stadium during and between showers in February and early March. These soft-bodied flies would hardly furnish enough indigestible débris for the formation of a pellet.

The maximum number of pellets found for one night was two. This happened three times, and in each instance one pellet was about one-third the size of the other. Usually one pellet was found. Pellet-casting was not peculiar to the male studied at the Stadium. On April 2 a pellet was found beneath the roost of the female.

Pellet-casting was not entirely confined to the roosting period. One pellet was found out in the open far from any roosting place. Also on one occasion after the bird had been feeding for half an hour, it perched on a wire ten feet from me, tilted its head up and down several times with the mouth open, and then with no sign of distress discharged a large pellet (8 mm. in diameter) which I recovered. The bird then continued its normal activity. Evetts (British Birds, vol. 25, 1932, p. 332) has made the following statement concerning certain experiments with captive European insectivorous birds. "The birds turned dull and comatose for periods varying from ten minutes to 2 hours before discharging the pellets." This interruption of activity was certainly not in evidence with the Black Phoebe. A comatose condition before or after pellet ejection may vary with the species or may be related to conditions of captivity.

It was not possible to determine frequency of daytime pellet-ejection. It seems likely that the riddance of indigestible material periodically during the day would speed up digestion. It is possible that this habit occurs regularly in other kinds of Tyrannidae. Ashbrook (The Blue Book of Birds of America, 1931, p. 18) in a brief discussion of the Say Phoebe (*Sayornis saya*) makes the following statement without comment: "... It ejects from its mouth in the form of pellets, the hard indigestible parts of its food."

LIGHT INTENSITY AND ROOSTING

Although degree of light intensity undoubtedly determines the strength of the urge to move to the roost in the evening, a complex of outside factors is evidently instrumental in delaying or hastening response to darkness. However, after a certain degree of darkness is reached, the roosting urge is irresistible. By measuring the light intensity at roosting time it was apparent that the bird did not always move to the roosting wire at the same intensity. Variation was noticeable even without reference to the meter. The roosts used were distinct from all daytime perches; hence, I knew at once when the bird moved on or off the roost. The Weston exposure meter, model 650, was exposed to maximum skylight each evening immediately after the bird moved to the roost and immediately after leaving the roost in the morning.

To avoid disturbing the bird, the same positions for observation were taken each morning and evening and the bird was watched through a glass. The dial of the exposure meter read in foot candles per square foot. It usually took approximately two minutes in the evening to lower the reading one unit. There was of course variation depending on the weather.

A graph was made representing the male's roosting time, beginning on February 9 and ending on April 2; it showed considerable fluctuation in light from day to day. Although low readings occurred on cloudy and rainy evenings, general weather condi-

tions were not sufficient to explain the fluctuation. For example, on the cloudy evening of February 14, when it had been raining continually for eighteen days and insects were scarce, the bird did not move to the roost before the exposure meter read 1.4, a low intensity. The next day, February 15, was clear, and the bird fed in regular fashion on the lighted west wall of the Stadium; it then moved into the roost apparently satisfied, at 10.9. It seemed that the rain and its effect on insects had caused the first delay of roosting. Nevertheless, on the drizzling evening of March 5 which was preceded by clear as well as rainy days, the bird moved to roost at a reading of 19.5. The next evening, March 6, was again wet; the bird continued to feed until a downpour of rain began, then flew to the roost as if stimulated by the drenching; the exposure meter read 10.5. The next evening there was no rain, although the day had been wet and cloudy, yet the bird went to roost at a reading of 19.5.

The factors which caused an extension of the feeding to a noticeably darker period one evening and for a much shorter period the next evening were evidently much too special and varied to be completely correlated with general weather conditions. The length of a period of unfavorable weather as well as the intensity of a brief storm might affect insect abundance. The amounts of energy used in feeding on windy and rainy days and in favorable days might have direct bearing on appetite and fatigue, and thus cause variation in the response to decreasing evening light.

If external factors cause this fluctuation in daily response to light, one would expect greater regularity in the readings for roost-leaving where the bird's physiological condition and the weather at a sheltered roost are more uniform than the corresponding conditions in the daytime. Tabulation of the results obtained showed that the fluctuation in light readings when the male bird moved to roost in the evening was greater than the lower and less varied readings when the same bird left the roost in the morning. Although fewer readings were available for the female, the results with the exception of one reading were similar. The male as well as the female moved from the roost at a much lower and less varied light intensity than that which prompted either to move to the roost in the evening.

Both birds reacted to outside disturbance by the observer in the morning before leaving the roost quicker than in the evening when already on the roost, although they were extremely sensitive at either time. In the morning, it was impossible for me to pass within fifteen feet of the bird without causing it to fly. Yet in the evening I could pass at the same distance without causing it to leave.

The female differed considerably from the male in sensitivity to light change. She went to roost from ten to twenty-six minutes earlier than the male and responded to the morning light from five to fifteen minutes later. This situation allowed me to take readings for both birds. Whether the female's longer roosting period was a sexual characteristic or merely an individual difference is not certain, for other pairs were not available for comparison.

Both birds were exposed to essentially the same environmental conditions; yet when the corresponding morning and evening lights at roosting or roost-leaving were compared, the fluctuations for the male were not paralleled by the fluctuations for the female. An evening of late roosting for the male might be an early one for the female.

From this evidence it might be assumed that outside factors influenced each bird differently. Slight differences in the physiological condition of the two birds would perhaps account for variation in the strength of the roosting urge under the same stimulation. Or, since even the maximum range of variation in readings usually came in less than fifteen minutes, it might be inferred that the bird moved by chance to or from the

roost within this range of light intensity. Yet if the factor were chance, there would be no explanation of the times when the bird flew to the roost, remained several minutes, then flew off again as if the light were still too intense. For example, the female moved to the roost at a reading of 22.5, remained a few minutes and moved out again to feed. After six minutes had passed, and at a reading of 15.5, she moved back to the roost and remained for the night. The bird did not roost at 22.5 on this evening, yet on the previous evening it had moved permanently to roost at a reading of 20.5, and several days before that at a reading as high as 26. Since late feeding was confined to the vicinity of the roost, the nearness of the roost to the bird at any particular moment was evidently not an inducing factor.

The roosting routine of the female was interfered with by the male on several occasions, when he chased her from her roost after she had apparently settled for the night. In one instance the male attempted to roost near the female and caused the latter to fly out several times before becoming permanently settled.

ROUTINE OF LEAVING AND MOVING TO ROOST

During winter when the male was roosting in the Stadium, it was relatively late in beginning its morning activity, being quite undisturbed by the early loud voices of the Western Robin, Brown Towhee, Spotted Towhee, Red-shafted Flicker, and White-crowned Sparrow which were heard more than twenty minutes before the Black Phoebe responded in any way to the light. The dark roost among the Stadium rafters, in contrast to the lighter condition outside, was evidently a factor in prolonging the roosting of the phoebe.

With the gradual increase in light at dawn the bird responded by the following routine of morning activities. When the bird was first clearly visible to me with an opera glass, and usually several minutes before light registered on the meter, the bird huddled close to the wire with its head pulled in, tail motionless and slightly drooping. As the outline of the bird became more distinct, the head began turning toward the light. When the bird was facing a wall, the body also turned on the wire. A soft, barely audible *tsi* usually was given, the tail fanned out in a brief downward tilt, one or both wings were stretched, and the head continued to extend out in peering movements toward the light as if to accommodate the eyes to the rays which came in through the passage-ways. Without further warning, a silent, bat-like flight would be made, fifty feet or so along the inside of the wall, where the light was the same as that at the roosting place. Then with an abrupt turn, one of three "favorite" shelves extending from the Stadium wall was selected for perching.

At the same time, a few soft *tsip* notes were audible; then the voice shifted to the clear and distinct *tieur* which gradually increased in frequency and volume until ten to thirteen notes per fifteen seconds had been reached. This *tieur,* which invariably preceded the song, resounded loudly for about a minute, then the bird suddenly burst into full song, *teehee teehoo,* two syllables of rising inflexion, an interval, then two syllables of falling inflexion and an interval. This song continued incessantly and energetically for several minutes. Sometimes the song was continued again after a few seconds of rest, but almost invariably it dropped to a series of *tieur* notes which in turn were followed by the common *tsip,* indicating that the song was over and that the bird was ready for feeding or mate chasing.

The regularity of the song in the early morning routine of the male is suggested by its occurrence on twenty-six out of twenty-seven mornings from January 26 to April 3. The singing appeared to have connection with early pairing (on January 23); it was not a part of the roost-leaving routine after the onset of summer.

In the Stadium in late February and early March, and later in the upper canyon roosting places, this male began notes preliminary to singing while on the roost. The first soft *tieur* notes would gradually build up to a level of ten to fifteen utterances per fifteen seconds. Then before the bird shifted to the song it would fly out and perch near-by; it would then immediately shift from the *tieur* into full song. The regular turning of the head was strikingly effective in making the same syllable of the song alternately loud and soft; this was an effective means of throwing the voice over a wide range of territory. One use of the song as a means of attracting a mate has already been mentioned in connection with the increased singing after the death of the male's first mate. This extended morning song period continued after permanent residence of the bird in the upper canyon territory where the song appeared to function as a territory claim long after the new mate had been acquired.

The phoebes gradually narrowed their range of foraging to within a short distance of their respective roosts with the approach of late evening. When the male had a roosting place in the Stadium, it gradually restricted its feeding activities to two or three shelves just outside the roost where it continued to voice the regular *tsip* note; then without warning it would dart through the open archway to the regular roosting wire, sometimes making a pursuit flight on the way. When on the roost the *tsip* would resound loudly as if to invite the immediate appearance of any lurking danger before the approach of complete darkness. Following the series of *tsip* notes, there was almost invariably a shift to the *tieur* which continued in gradually decreasing volume and frequency, until the utterances were scarcely audible; finally there was complete silence.

Except for absence of song, the voice at the close of the day died away in the same fashion as it gradually built up in the morning. The voice changes seemed to reflect the gradual waning of the bird's alertness as it settled for rest in the evening. All head-turning and tail-movement stopped; the bird became completely motionless, a condition never observed in the daytime.

In the upper canyon this bird moved to the roosting site in essentially the same manner as described above. The earlier roosting female, on the other hand, was again distinguished in the evening by its complete lack of voice when moving to its roost. Although *tsip* notes were given during evening feeding, the voice immediately stopped as this bird moved to the roost where it assumed the motionless roosting position.

HABIT FORMATION FOR SPECIFIC ROOST SITES

Both birds roosted in the upper canyon for the first time on March 14. The birds on this evening were chasing each other and moving on and off several roosts. On March 17 the female had moved in on the roost beneath the eaves of house no. 7; the male moved in with her but soon came out again; he made three attempts to return but each time was rebuffed by his mate. Finally the male moved to house no. 14 where he roosted.

The next evening, March 18, both birds moved in together again at the same roost at house no. 7; the male was forced out again; it selected a new roosting place nearby, but did not use the roost at house no. 14; but by March 28 a change had been made to house no. 1 which continued, with one exception, to be used until April 24. The exception occurred on March 31 when the male again attempted to roost next to the female; he was rebuffed and selected, for this one night, a temporary near-by roost (house no. 6).

On the night of April 24 I frightened the male from its regular roosting place (house no. 1). It flew off in the dark and did not return the next evening. But by April 31 it was back again at the same roost. On May 18 I once more frightened the bird away from this roost after dark. This last scare caused a longer absence from this otherwise desirable roosting place. There was no evidence that the bird returned until June 11,

after which date it continued to use this roost regularly. The temporary desertion of this habitually-used roosting place after a single disturbance indicated extreme sensitivity.

As with the male, the female also tried several roosts before forming the habit of using a particular one. On March 21, the day following the preliminary use of house no. 7, both birds were attempting to catch fish in the pond in the northeast corner of the Botanical Garden. With the approach of darkness the female became motionless on a horizontal willow twig from which it had been watching for fish. The male being less sensitive to darkness continued his activity for a few minutes, then flew directly back to the camp to roost. Meanwhile the female remained motionless. She was found in precisely the same position at dawn of the next day when she was observed to fly directly back to the camp to join the already active male.

On March 24 and 25 the female again roosted in the camp, but both times at house no. 12. On March 26, as on the 21st, this bird remained to roost near the pond after feeding there. On March 28 the female again used the roost at house no. 12, and continued thereafter to return to this roost until some time between April 4 and 12 when it began to sit on the nest on house no. 14.

Both birds had taken nearly the same length of time to form the habit of returning to a roosting place. Both began roosting in the upper canyon on March 14. The male selected a permanent roost by March 26, the female by March 27. The advantage to the species in forming the habit of returning to a secure roost is in unfavorable weather. If a heavy storm had occurred when the female roosted temporarily on the exposed willow limb, the bird might have been drenched. At least it would have been forced in the dark to seek shelter. Hence the bird's chances of survival were fewer before the habit of returning to a sheltered roost was strong.

PAIRING AND NESTING

Except for two brief appearances of a second phoebe, on September 24 and on October 10, the bird in lower Strawberry Canyon was solitary in fall and early winter. Both times, the resident phoebe reacted to the intruding bird by rapidly chasing it and uttering a *tweedle-deedle-eek* in each upturn of the darting pursuit. Afterwards the birds parted and resumed their respective perches. Both times the second bird disappeared after a few moments; immediately the residing bird moved to a high perch and sang energetically for several minutes; it then resumed the regular routine of feeding. This chasing was similar to that in the initial pairing and possibly represents declining of the mating urge in the fall.

In early fall the *tsip* note was frequently replaced by the drawn-out *tieur*. This call is evidently associated with the waning mating urge, since series of these utterances were heard irregularly but frequently (sometimes for several hours at a time) until after October 16; then with the exception of three on November 6, the *tieur* was entirely replaced by the regular *tsip*. The *tieur* was not heard again until the pairing on January 23, after which it was used frequently by both birds.

When the pair became separated by more than three hundred feet, it was common to hear this *tieur* given by one with the apparent effect of bringing the birds together. Also this *tieur* almost invariably preceded the regular song, which was relatively infrequent except during the roost-leaving in the mating season.

Since the bird in the Botanical Garden had been alone before January 20, pairing occurred first on January 23 or a day or two earlier. Both birds were then moving on and off the same site where a phoebe's nest had been built and removed in the previous year. Each bird peered at the nest site, then moved away to feed. Frequently the birds ap-

proached each other attentively, uttering a soft, wheezy sound; then without warning one would pursue the other closely for several seconds in a darting chase. The pair then parted to resume their respective perches, essentially the same as in the fall.

Each morning after the birds had left their roosts and had finished singing, there was much chasing and maneuvering about the nest site. The pair would then move to nearby areas to feed. They then usually remained from twenty-five to fifty feet apart, rarely separating more than two hundred feet. The pair wandered about considerably in the canyon early in the pairing season. The tendency to become localized grew stronger with the onset of summer. On the drizzly morning of February 28 the female was building a nest; gobs of mud were plastered around an electric wire where it pierced the wall under the protecting eave of house no. 14.

The mud and bits of dry grass were gathered from a stream bed sixty feet west of the nest. The bird continued to make trips, returning every few minutes with mud which was carefully pressed against the wall. The building was entirely done by the female; the male remained near, feeding and perching, and frequently flew off to the feeding areas of the Botanical Garden. Occasionally it would burst into song while perching near the nest.

When the nest builder arrived at the stream, it would pause on a willow branch, peer about for a likely spot, then flutter down on the leaf-strewn, muddy bed of the stream. Here it would take from six to thirteen pecks at the mud and pieces of dry grass, then fly quickly back to the nest. This work would last for ten to fifteen minutes; then feeding would be resumed, and the bird would move away to join its foraging mate.

By March 2 the nest was about half finished, but no building took place that afternoon. Instead, the pair moved about in feeding. On March 4 the nest appeared nearly complete; it remained in about the same stage until March 11, the date on which the female was found dead on the nest. The bird had been working on the nest just before it had been killed; this was evident from the mud-covered bill. The nest was almost complete except for a small hole, possibly knocked out by shot from an air rifle. This nest had been under construction for more than a week, indicating a less urgent drive to build than was present later in the season.

On March 14, after the male had been without a mate for three and a half days, another female arrived. Mate chasing became more frequent than ever; both birds remained in such close association that for a few evenings the male attempted to roost on the same wire with the female. During the day the pair continued to feed and range over the same feeding areas used before the substitution of the new female. It seemed that the male influenced the ranging of the newly acquired mate, since this female began to fly in and out of the ready-made nest and moved back and forth over the same feeding areas without any noticeable departure from the routine of the previous mate.

By April 9 this nest had become slightly detached from the wall; it was securely fixed in place by the new female. More lining was added, but the small hole in the bottom was left unrepaired. This new mate substituted for the lost one even to the extent of using the ready-made nest. Meantime both birds had become surprisingly silent; rather long quiet periods had been noted on the part of the female for several weeks, but by mid-April both birds had ceased to give the *tsip* note in flight and were silent for long periods while perched. Occasionally a few *tsip* and *tieur* notes would be heard but more frequently the pair would feed in complete silence. This silence made them inconspicuous and as a result they became difficult to follow. They began to focus most of their feeding activities about the nest. The male still wandered about in the Botanical Garden, but the female remained relatively close to the nest.

On April 12 the female was on the nest; she remained perfectly still, moving off for a period of quiet feeding. The same was observed on April 13, 16, and 17; as yet no eggs were laid. By April 22, five eggs had been laid and the female was incubating. When leaving the nest, she would drop silently to within a few feet of the ground and glide inconspicuously away to perch and feed. Little sign of distraction was exhibited at my approach until after the eggs had hatched. The male continued to move to the near-by feeding areas alone, but returned to his regular roost and apparently took no part in incubation. It was common for the female to leave the eggs for as long as thirty to fifty minutes at a time, but she did not range, even in foraging, with the male.

On May 9, seventeen days after the last egg was laid, one egg hatched. The next day, May 10, two more eggs had hatched; the young were orange and had traces of neossoptiles on the head, back, and wings.

On May 11, one dead nestling, one injured nestling, and two broken eggs were found on the ground below the nest; the third nestling could not be found. The injured bird was replaced in the nest but was dead the next day. The female deserted and again ranged with the male. Both birds, however, continued to be silent. The stomachs of the two fledglings contained mostly soft dipterous débris, including small compound eyes, parts of legs, and soft body parts. There were no wings or other large indigestible fragments.

By May 18 another nest was being built. This new one was plastered beneath the south eave of house no. 7, the base being supported by a wire. A stream of water was running below the nest. The construction again was apparently entirely by the female; the male merely perched and fed near-by, wandering considerably more than the female. The latter was now shy and appeared reluctant to continue work when I came within a hundred feet. Instead of collecting material from banks of the stream immediately below the nest, the bird flew more than two hundred feet upstream to get mud and grass. Apparently this extra exertion was necessary to obtain mud of proper adhesive character.

On May 22 the nest was lined with soft, dry grass and ready for eggs. Four days later, on May 26, four eggs were found, and another on May 27, when incubation had begun. The female remained near-by, completely silent, when the eggs were inspected. On the evening of June 10 the eggs were still unhatched, but the next day, June 11, fifteen days after the last egg had been found, two nestlings were completely hatched and a third was breaking through its shell. The female, now greatly distracted at my approach, darted at me with loudly snapping bill. The male also was showing greater attention than ever before. Next day the fourth nestling appeared; the remaining egg failed to hatch. Both parents now became extremely noisy at the slightest disturbance; neither strayed far from the nest, although the female was far more attentive. It was impossible to observe the feeding, but both parents moved to and from the nest frequently during the day, apparently bringing food.

On June 25 the four fully feathered nestlings were banded with Biological Survey bands, numbers: 38-8447,-48,-49,-50. Both parents now remained almost exclusively within seventy-five feet of the nest; the insect supply was rich both in the air and on the dry grass and stream bank. On June 30 the young birds were nearly grown, and the nest was conspicuously overcrowded. By July 1, twenty-one to twenty-two days after hatching, the nest was deserted. Parents and young were feeding together in the near-by Botanical Garden. No longer were the parents silent, instead the *tsip* was voiced continually as if it were a means of keeping the yet dependent young together. The voices of the young birds were distinctly higher in pitch than those of the parents. Although

the young were successfully taking slow-moving butterflies and other easily obtained insects, they continued eagerly to accept the morsels brought by their parents.

On July 2 both parents were found noisily feeding near the empty nest; they were engaging in numerous mate-chasing flights. Two of the young birds made their appearance from time to time and were fed, whereupon they separately moved away. The other two birds could not be found. The parents continued to be together, loudly voicing their presence, but not following their offspring for more than a hundred feet. Already the young birds ranged independently about the feeding areas.

On July 7 the four young phoebes were together along the Botanical Garden fence. They were actively foraging; their voices could no longer be distinguished from those of the parents, one of which was feeding near-by. At my approach they scattered to various feeding areas within the Garden.

On July 16 three young and one of the parents were again feeding together over a grassy area in the garden. The young birds were tapping their insect food against the perches in the same manner as that already described for their parents. Although they appeared then to be fully grown, an occasional morsel was accepted from the parents.

San Francisco, California, February 6, 1939.

FALL WANDERINGS OF CLAPPER RAILS

By ROBERT T. ORR

Records of Clapper Rails (*Rallus obsoletus*) wandering from their normal environs in the fall and early winter are becoming so numerous as hardly to justify the publishing of further instances. Linsdale (Condor, vol. 38, 1936, p. 216) and Wythe (Condor, vol. 39, 1937, p. 44) record several dead individuals of this species found in Berkeley and Oakland in the months of September and October. The Gull for November, 1936, March, 1937, and December, 1938, lists many other records of occurrence of Clapper Rails in unusual localities in the San Francisco Bay region in the fall of the year. However, certain additional information obtained relative to the adaptability of Clapper Rails seems to deserve comment.

We normally look upon the California Clapper Rail as a very restricted race, resident in the salt marshes of San Francisco and Monterey bays. In fact, all four races of *Rallus obsoletus* are extremely restricted in range and habitat. In central California the species is associated with salt marshes and sloughs bordered by extensive growths of pickleweed. When, therefore, members of such a species are observed to survive and carry on their normal activities for a time in environmental surroundings totally different from that to which they are accustomed, such information becomes important from the viewpoint of specific adaptability.

The presence of a Clapper Rail in the immediate vicinity of the California Academy of Sciences in Golden Gate Park, San Francisco, was first called to my attention on November 25, 1938, on which date one of the staff mentioned seeing an individual of this species on the previous day next to the Simpson African Hall. On inquiry I discovered that park gardeners had seen this bird daily, since about November 15, in this immediate vicinity. I was personally able to make almost daily observations upon it until December 5, 1938, after which date it was no longer seen about the Academy buildings. On December 2, one of the gardeners reported seeing two Clapper Rails, one

slightly smaller than the other, feeding on a lawn about 300 yards northeast of the area where the first noted individual was still in evidence. Several other observations of individual rails were given me for this general vicinity but these might easily have concerned any of the three birds known to have been present in this region rather than additional individuals.

Certain facts were noted regarding the behavior of the rail that was observed daily from November 24 to December 5. It remained, so far as known, during this period within an area approximately 225 by 100 yards, about one-third of which was occupied by buildings. A definite preference was shown for lawns, particularly the margins of lawns adjacent to shrubbery. Practically no fear of man was exhibited. One could readily approach within 15 feet of the bird in the open without it displaying any sign of wariness. On closer approach it would usually walk sedately away, often feeding as it did so. Earthworms appeared to form the principal item of diet in its new environment. In one instance it was observed to swallow 5 worms during a period of 5 minutes. Most of the time in the open was spent within 15 feet of protective shrubbery into which it would disappear every few minutes for short periods of time. When crossing open spaces of lawns, as it was occasionally forced to do when skirting along the margins was not possible, it progressed somewhat more rapidly, never appearing to run or even hurry but at the same time not delaying to feed. It was seldom seen during midday but regularly appeared during the morning until about 11:00 a.m., and from mid-afternoon until sunset.

We witness here the occasion of a species of extremely restricted habitat leaving the preferred type of territory in what is probably a spreading out movement in search of less populated areas that are suitable to its demands, and arriving in seemingly blind fashion in a habitat very different from that to which it is accustomed. Furthermore, in this new and different territory it would appear that at least certain members of the species are sufficiently adaptable to enable them to survive at least for some time. Might not such an inherent tendency to participate in this dispersal, combined with a certain capacity to adapt itself to habitats other than the so-called normal, ultimately influence a species of specialized requirements to become more generalized? This is, perhaps, contrary to current concepts of the way nature works, but at the same time it looms as a possibility still to be reckoned with.

While such speculation is purely theoretical, certain practical features do suggest themselves. The species under consideration is in ultimate danger of having much of its original habitat about the south arm of San Francisco Bay modified by human interests (see DeGroot, Condor, vol. 29, 1927, pp. 259-270). It is logical that natural increases in the rail population, which is given state and federal protection from hunting, combined with curtailment in available habitat, should result in a tendency for a certain percentage of this population to search for less crowded and, at the same time, suitable territory. In former days this species commonly occurred in the marsh land bordering the Marin shores of San Francisco Bay and also about San Pablo Bay. The virtual extermination of the Clapper Rail from these marshes was probably due in large measure to hunting, both private and for market. These marshes, while changed to a great extent from their original condition, still offer some possibilities for this species that once normally occurred here. If, as a result of these fall wanderings, normal breeding stock accidentally arrives and survives here, we may in course of time witness another instance of reinvasion by a species, partly as a result of protection.

California Academy of Sciences, San Francisco, California, February 15, 1939.

TWO FOSSIL BIRDS FROM THE LOWER MIOCENE OF SOUTH DAKOTA

WITH ONE ILLUSTRATION

By ALDEN H. MILLER and LAWRENCE V. COMPTON

In collections made by the University of California Museum of Palaeontology in 1934 near Martin, South Dakota, are remains of two avian species from the Lower Miocene. These came from Flint Hill, locality V 3417, SW quarter sec. 31, R 38 W, T 37 N, 9 mi. WSW of Martin, Bennett County. Mr. R. A. Stirton, in charge of the field party, reports that the Flint Hill fauna was taken from a lens in the upper part of the so-called Rosebud formation, Lower Miocene.

The bird bones represent an anseriform and a falconiform. The anseriform is an aberrant type, the size of a swan, which appears to belong to a distinct family within the order. The fossil falconiform is related to the Old World vultures of the subfamily Aegypiinae, a group that now is extinct in the New World. With the addition of this species there are now known six American representatives of the Aegypiinae. Thus it is evident that these vultures were a fairly prominent element in our avifauna of the past.

We are indebted to Mr. R. A. Stirton for the opportunity of studying these avian fossils and for assistance in arranging for the illustrations which were made by Mr. Owen Poe. Dr. Hildegarde Howard kindly offered valuable advice as to relationship of the falconiform and made available the comparative material in the Los Angeles Museum of History, Science and Art.

Family PARANYROCIDAE, new family

Anseriforms with only two calcaneal ridges of the tarsometatarsus well developed; medial calcaneal ridge rounded in profile, as viewed medially, and smoothly continuous with crest of internal cotyla; articular surface of lateral trochlea of metatarsus faces obliquely laterad; metatarsal II not strongly deflected toward plantar surface.

One genus and species is known from the Lower Miocene of South Dakota, which may be described as

Paranyroca magna, new genus and species

Characters. Tarsometatarsus, distal end.—Differs from all other anseriforms as follows: articular surface of outer trochlea faces much more laterad, the outer flange much lower than the median; innermost trochlea less deeply grooved; posteromedial edge of distal end of metatarsal II much less abruptly deflected from shaft, and medial surface proximal to articular surface well excavated with its distal margin less rounded (see fig. 33); groove on plantar surface between ends of metatarsals II and III more excavated, resulting in larger hollow on lateral surface of II and shortening of medial ridge of trochlea of metatarsal III. Resembles the extinct *Chendytes*, the modern *Melanitta* and *Mergus*, and the diving ducks generally in configuration of trochleae, and especially in their relative location; differs from other ducks, and from swans and geese, in lateral compression of plantar surface and consequent proximal and lateral (in relation to axis of body) position of end of metatarsal II. Bridge distal to the intermetatarsal foramen pierced by tendinal canal from within foramen as in geese and swans, not superficially as in scoters. Scar for articulation of metatarsal I absent as in Anatidae (present in Anhimidae).

Proximal end.—Profile of largest, medial calcaneal ridge much more rounded, as viewed medially, than in other anseriforms; proximal end of ridge continues smoothly into crest of internal cotyla. Area on medial surface below internal cotyla depressed, due in part to crushing. Small, deep depression lateral to junction of calcaneal ridge and internal cotyla unlike configuration in most other anseriforms. Second and apparently fourth calcaneal ridges of the Anatidae lacking, a broad bipartite groove lying between medial and lateralmost (third?) ridge; smooth, well-preserved surface gives no hint of loss of ridges through breakage. Lateral ridge somewhat sharper than in Anatidae and more laterally deflected. Scars of ligamental attachments of lateral surface extremely close to rim of

cotyla; diving ducks, of all anatids, most nearly approach this condition (exact configuration subject to much individual variation). Anterior part of proximal end broken away. Articular surfaces poorly preserved, but general configuration much as in Anatidae, not as in Anhimidae.

Shaft.—Anterior medial ridge of shaft immediately distal to head not strongly concave as in scoters and *Chendytes*, but straighter as in swans and geese. Proportions of shaft and ends similar to those in swans and geese.

Type.—Left tarsometatarsus, nearly complete, no. 34456 Univ. Calif. Mus. Pal., field no. 1020, from Lower Miocene, Rosebud formation, 9 mi. WSW Martin, Bennett County, South Dakota. Collected by R. A. Stirton, June 13, 1934.

Measurements.—Type, total length from prominence on posterior rim of internal cotyla, 111.0 mm.; transverse diameter across trochleae, 21.2; least transverse diameter of shaft, 9.0.

Second, incomplete left tarsometatarsus, distal end only, no. 34457, field no. 1020, same locality as type, transverse diameter across trochleae, 20.2; least transverse diameter of shaft, 9.0.

Paranyroca was a large anseriform, the size of a whistling swan, and considerably specialized for swimming and diving. In adaptive type it paralleled the modern diving ducks (Nyrocinae). This is seen especially in the arrangement of the trochleae and in the lateral compression of the distal end of the tarsometatarsus; this trend in configuration reaches an extreme in the grebes and loons. The proximal end of the tarsometatarsus of *Paranyroca* does not show any special modification for diving, but it does not depart greatly from the pattern of the Nyrocinae. In a few particulars, such as the straight anteromedial ridge of the shaft just distal to the head and in the moderate height of the principal calcaneal ridge, it is less specialized for aquatic activity.

The configuration of the hypotarsus differs strongly from that of other members of the suborder Anseres and represents a primitive state in the evolution of tendinal grooves. This condition is roughly equivalent to that in the screamers, suborder Anhimae. However, the latter in many other respects, such as the configuration of the proximal articular surfaces, the development of the first metatarsal and the arrangement of the trochleae, are widely set apart from typical anseriforms. Actually the hypotarsus of *Paranyroca* resembles that of the albatrosses as much as it does that of the screamers.

We may conclude that *Paranyroca* represents a distinctive and primitive anseriform family which may have some special phylogenetic relation with the Nyrocinae of the Anseridae. It shows more affinity to the Anseridae than does the Anhimidae and may be included with the former in the suborder Anseres.

The only other North American anseriform fossil known from the Miocene is *Presbychen abavus* from the Temblor formation in California. This species is based on the distal end of the tibiotarsus. Wetmore (Proc. Calif. Acad. Sci., vol. 19, 1930, pp. 92-93) emphasizes its resemblance to *Branta canadensis* and places it in the Anatidae. There seems to be little to suggest aberrancy of the degree seen in *Paranyroca*. *Chendytes* of the Pleistocene is typical of the Nyrocinae, although much larger than living members of that group.

Of other fossil anseriforms, there are only two that represent distinct subfamilies under the Anatidae. *Eonessa anaticula* (Wetmore, Jour. Paleo., vol. 12, 1936, p. 280) of the Eocene of Utah is known from wing bones that differ in a number of particulars from those of the Erismaturinae, the modern group that *Eonessa* approaches most closely. There is no means of determining any affinity of *Eonessa* with the much larger *Paranyroca*. *Romainvillia* (Lebedinsky, Mem. Soc. Paleo. Suisse, vol. 47, no. 2, 1927, p. 1) was placed in a separate subfamily (Romainvillinae) by Lambrecht (Handbuch Palaeornith., 1933, p. 351). It was found in the Upper Eocene of the Paris Basin and, among other parts, is known from an incomplete tarsometatarsus. The hypotarsal region is lacking, so that it is not known whether it was primitive, as is *Paranyroca*, in the configuration of this region. The articular surface of the lateral trochlea is not directed

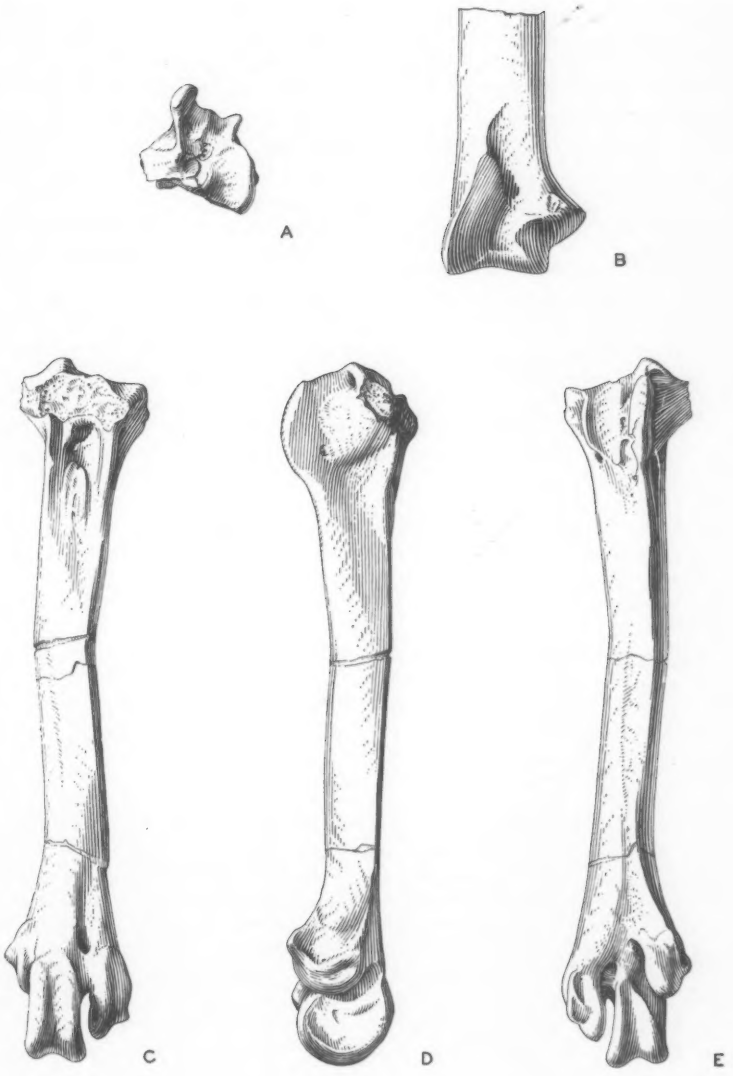


Fig. 34. A, C, D, E, tarsometatarsus of *Paranyroca magna*, type, no. 34456 Univ. Calif. Mus. Pal., all natural size; A, articular surface of proximal end; C, anterior view; D, medial view; E, posterior view.

B, internal aspect of distal end of ulna of *Palaeoborus rosatus*, type, no. 34452, Univ. Calif. Mus. Pal., × 1⅓.

obliquely laterally, and the end of metatarsal II is strongly deflected toward the plantar surface and is not set far proximally relative to metatarsal IV. The general aspect of the tarsus is that of shortness and breadth. Thus, nothing more than a general ordinal resemblance between *Paranyroca* and *Romainvillia* is discernible from the figures and descriptions of the latter.

Family ACCIPITRIDAE
Subfamily AEGYPIINAE

Palaeoborus rosatus, new species

Characters.—Ulna similar to that of *Neogyps errans*, but carpal tuberosity larger and, proximally, more abruptly deflected from shaft; lateral surface of external condyle flatter; proximal crest of external condyle straighter and more in line with shaft; size 7 per cent larger.

Type.—Left ulna, complete and well preserved distally, but proximal end shattered; no. 34452 Univ. Calif. Mus. Pal., field nos. 1020, 1028, from Lower Miocene, Rosebud formation. Collected by R. A. Stirton, June 14, 1934.

Measurements.—Length from tricipital attachment to distal end, 241 mm.; distance from distal articular surface between condyles to proximal end of crest of external condyle, 15.8 ("height of condyle" of Howard, Carnegie Inst. Wash. Publ. no. 429, 1932, p. 53); least diameter of shaft 9.5.

The ulnae of the aegypiine vultures may be distinguished from those of the eagles (Aquilinae) by the longer crest of the external condyle as Howard (*op. cit.*) has shown. The length of the condyle in *Palaeoborus rosatus*, as per cent of ulnar length measured to the tricipital attachment is 6.5; 6.2-6.6 in *Neogyps errans*; 6.4-6.9 in the modern aegypiine vulture *Sarcogyps*; but, 7.9-8.3 in *Haliaeëtus* and 9.6-10.1 in *Aquila*. Except for this feature of condylar length, *Palaeoborus rosatus* has considerable resemblance to *Haliaeëtus*. It differs additionally, however, in the shorter tendinal pit, convex distal outline of carpal tuberosity, straighter crest of external condyle, flatter lateral surface of external condyle, and more slender shaft.

Although it is apparent that the fossil represents another member of the Old World Aegypiinae that occurred in North America up to the Pleistocene, its generic assignment is by no means certain. *Palaeoborus umbrosus* (Cope, Proc. Acad. Nat. Sci. Phila., vol. 26, 1874, p. 151) and *Palaeoborus howardae* (Wetmore, Proc. U. S. Nat. Mus., vol. 84, 1936, p. 73) of the Miocene are not represented by the distal ends of ulnae. *Neophrontops dakotensis* (Compton, Am. Jour. Sci., vol. 30, 1935, p. 344), a small aegypiine from the Pliocene of South Dakota, is known only from the distal end of the humerus. The fossil aegypiines with complete ulnae are those of the Pleistocene, *Neogyps errans* and *Neophrontops americanus* (see Howard, *op. cit.*). *Neophrontops* and the modern *Neophron* appear to represent a phyletic line distinct from *Palaeoborus* and *Neogyps* which were of more eaglelike aspect. Because the new fossil, *rosatus*, resembles *Neogyps* more than it does *Neophrontops*, its generic affinities would seem to lie either with *Neogyps* or *Palaeoborus*; the osteologic characters that are preserved are not such as to warrant establishing a new genus. Although *rosatus* compares closely with *Neogyps*, there is much reason to think that it would also be very similar to *Palaeoborus* which perhaps was ancestral to *Neogyps*. Rather than extend the time range of *Neogyps* back to the Miocene, it seems best to place *rosatus* with the then existing *Palaeoborus*. *P. umbrosus* and *P. howardae* are sufficiently small to preclude specific identity with *rosatus* which was slightly larger than the bald eagle (*Haliaeëtus leucocephalus*).

Museum of Vertebrate Zoology, Berkeley, California, May 29, 1939.

BIRD RECORDS FROM UTAH AND ARIZONA

By ANGUS M. WOODBURY

In the course of ornithological collecting for the University of Utah in anticipation of a publication dealing with Utah birds, a few records have accumulated that it is deemed advisable to make known at this time. They include not only our own records but additionally those from sources credited in the following discussions. The museum initials preceding specimen numbers in the text represent the following institutions: U.U., the University of Utah at Salt Lake City; U.S.A.C., the Utah State Agricultural College at Logan, Utah; B.Y.U., the Brigham Young University at Provo, Utah; G.C., Grand Canyon, Arizona; U.S.B.S., the U. S. Biological Survey, Washington, D.C.; U.S.N.M., the U. S. National Museum, Washington, D. C.

Phalaropus fulicarius. Red Phalarope. The number of inland records of the Red Phalarope indicated in the last edition of the A.O.U. Check-list has been increased in the last few years by scattering records from the southwestern states. For example, the species has been reported by Stevenson (1937, p. 92) from the panhandle of Texas, October 12, 1933; by Hayward (1937, p. 304) from the Virgin River in southwestern Utah, October 14, 15, 1934; and by Bailey and Niedrach (1938, p. 227) from a reservoir in Kiowa County, Colorado, June 27, 1938.

To this list I have to add a record for Arizona, an adult female (U.U. 4154) taken July 19, 1938, by the writer and H. N. Russell, Jr., at Cow Springs Lake, Coconino County, Arizona. This lake, 5800 feet altitude, depends upon intermittent streams from storms for its maintenance. It has no outlet and consequently fluctuates greatly as the balance between inflow and evaporation changes from time to time. In mid-July, the level was at low-water stage and the lake was literally packed full of pond-weed.

There were on the lake a few scattered aquatic birds, including a Treganza Blue Heron, a Widgeon, a Pintail, four Lesser Scaup Ducks, two Wilson Phalaropes, two Least Sandpipers and a Solitary Sandpiper. The birds were flushed several times and the Red Phalarope tended to follow the ducks and the Wilson Phalaropes, but not invariably. The last time they flushed, the Red Phalarope remained on the water alone and was easily taken.

Coccyzus americanus occidentalis. California Cuckoo. On August 20, 1932, my nephew, Rulon Woodbury, gave me a young bird of this species which he took in the orchard on his father's farm at Berry Springs on the Virgin River, about five miles west of Hurricane, Washington County, Utah. This is the only skin (U.U. 1582) in our collection, but we have five sets of eggs from Salt Lake County and there is a skin at Brigham Young University (no. 155) taken at Bluff on the San Juan River in southeastern Utah, July 2, 1927.

Of the five sets of eggs from Salt Lake County, one set of six eggs (U.U. 3279) taken July 7, prior to 1899, and one set of three eggs (U.U. 3277) taken July 2, 1899, had both started to incubate, but a set of three (U.U. 3276) taken September 6, prior to 1899, and a set of four (U.U. 892) taken May 25, 1910, were both fresh. Incubation on a set of five eggs (U.U. 886) taken June 2, 1913, is not indicated. The nests were all of simple construction, composed of a few twigs or sticks. One was in a small cottonwood, 10 feet up, but three others were in the outer boughs of willows a few feet up, and two of them were on limbs overhanging small streams of water.

Some additional records have come to my attention. There is a set in the Field Museum at Chicago from American Fork, Utah County, taken by G. McNeill, June 26, 1893.

Ashby D. Boyle has an egg that was fresh June 20, 1921, when taken from a nest 6 feet up in the crotch of a scrub oak on a side hill bordering a marshy pasture near the mouth of Weber River southeast of Ogden. He remarks that the nest was so flimsy he could almost count the sticks of which it was composed without taking them apart.

Charles W. Lockerbie's notes indicate that he observed one bird at Cottonwood, Salt Lake County, June 12, 1934.

Otus flammeolus. Flammulated Screech Owl. Although this owl ranges from Canada to Guatemala and should be expected to occur in Utah, records in the literature are rare. Oberholser (1899, p. 15) reported a specimen taken near Salt Lake City in the fall of 1895; it had been in the collection of Charles E. Aiken. Hayward (1937, p. 304) reports one from Pine Valley Mountain, Washington County, taken October 20, 1935, and one from Mount Timpanogas, Utah County, July 3, 1937.

Several records accumulated at the University of Utah definitely establish it as a breeding bird and indicate that it is widely distributed even though seldom observed. Mrs. A. O. Treganza reports by letter of March 23, 1939, that the Treganzas observed several pairs breeding at Dry Lake in the tops of the Tintic Mountains (7200 feet) west of Utah Lake between May 5 and 13 on four different years from 1912 to 1916. The nests were located in woodpecker holes 20 to 40 feet up in conifers.

On June 5, 1932, J. M. Mullen found a bird and one egg in a hole 18 feet up in a live aspen in South Willow Creek Canyon, southwest of Grantsville, Tooele County, Utah. A nuthatch had a nest in the same tree. A week later, June 12, 1932, he found another nest with an adult female bird and two eggs well advanced in incubation 15 feet up in a dead aspen in the same canyon. The bird was taken for a specimen (U.U. 5573). The eggs are in Mr. Mullen's private collection.

A single bird was observed by C. W. Lockerbie in Memory Grove at the mouth of City Creek Canyon, Salt Lake City, October 26, 1934. He flushed it several times for observation and made note of its small size and short rounded "ear" tuft.

An adult male (U.U. 4101) was taken by H. N. Russell, Jr., on the Rainbow Bridge-Monument Valley Expedition of 1936 in the willows near War God Spring on Navajo Mountain, San Juan County, Utah, July 6, 1936. Its stomach contents included a moth and two each of two species of carabid beetles. He observed other birds of this species several times on Navajo Mountain, usually in the coniferous forest, but also in the willows along War God Spring, where he heard one calling on July 6 and 12, two on July 20 about 10 p.m. and one on July 21, 1936. Another was heard calling at nightfall on the east rim of Beaver Creek Canyon, 6500 feet, north of Navajo Mountain on August 8. The next day one was observed by L. C. Cole in broad daylight in the pigmy conifers in Beaver Creek Canyon, 4500 feet, eight miles north of Navajo Mountain.

Strix occidentalis lucida. Mexican Spotted Owl. It is known that the range of the Mexican Spotted Owl extends northward well into Arizona, but it is believed that a specimen taken at Navajo Mountain, San Juan County, Utah, by H. N. Russell, Jr., August 13, 1936, sets a new limit to the northern extension of its range. The specimen was an immature male (U.U. 4168) with considerable down on the underparts. It was taken in Navajo Creek Canyon at the north foot of Navajo Mountain in a mixed stand of pines, firs and Gambel oak at an altitude of 6500 feet.

An adult bird, large and dark, believed to be of this species, had previously (July 28, 1936) been flushed by Russell in the junipers and pinyons about one mile northwest of the Navajo Mountain Trading Post on the Utah side of the Utah-Arizona line. These records seem to establish it as a breeding bird in extreme southern Utah south of the Colorado River.

Cryptoglaux acadica acadica. Saw-whet Owl. Although Utah is well within the range of the Saw-whet Owl, recorded occurrences of the bird from the state are not numerous, probably not because the bird itself is rare, but because of its seclusive habits. The only printed reference found is that of Presnall (1935, p. 202), in which he states that two birds had been seen, one of which was taken, but the skin had been accidentally destroyed. Records accumulated at the University of Utah indicate that it is a winter resident as well as a breeder, using hollow trees or woodpecker holes in cottonwood, aspen, and juniper.

M. R. Cheeseman took a set of five eggs (U.U. 2185) well advanced in incubation from a woodpecker hole in a cottonwood tree near Walker's Lane, southeast of Salt Lake City, Utah, April 6, 1905. The Treganzas report finding the bird breeding in the mountains west of Salt Lake City and on the east side of the Wasatch Range, in holes sufficiently large from 3 to 30 feet up in almost any kind of tree.

J. L. Mullen and his son J. M. Mullen found a nest containing both young and adults in a hole about 9 feet up in a juniper tree south of Vernon, Tooele County, Utah, May 25, 1930.

J. M. Mullen took a set of six eggs well advanced in incubation from a nest on which an adult bird was found in a hole (3½ inch opening, 10 inches deep) 10 feet up in a cottonwood tree, in Willow Creek, Tooele County, Utah, April 5, 1931. He also found a nest containing well feathered young in a hole 18 feet up in a dead aspen in a deep ravine near the summit of Parley's Canyon southeast of Salt Lake City, Utah, May 17, 1931.

Fall and winter records include a specimen (U.U. 2477) taken in the willows along the Jordan River northwest of Salt Lake City, Utah, December 31, 1934; a specimen in the collection of the High School at Moab, Grand County, Utah, taken in the willows along a canal bank near Moab, November 15, 1936; and an observation at very close range by C. W. Lockerbie at Memory Grove in the mouth of City Creek Canyon, Salt Lake City, Utah, October 27, 1931.

There is also a record kindly furnished by the Brigham Young University of a specimen (B.Y.U. 1544) taken at Lehi, Utah County, March 27, 1937. More recently, Mr. G. R. Walker reports finding a bird dead on January 17, 1939, under a squawbush, *Rhus trilobata*, near his home in the heavy cottonwood grove at the mouth of Cottonwood Canyon at Holladay, Salt Lake County, Utah. He

had noticed the day before a group of crested jays (*Cyanocitta stelleri*) mobbing a Saw-whet Owl and wondered if this was the result. He states that this owl is a permanent resident of the cottonwoods in that vicinity, occupying natural hollows or large woodpecker holes in the trees, and that he has remembrances of these owls for many years back.

Pyrocephalus rubinus mexicanus. Vermilion Flycatcher. The Vermilion Flycatcher appears to be a sparse permanent resident of the Virgin River Valley in southwestern Utah, being found occasionally at nearly all seasons of the year. Henshaw did not find it in 1872, but Fisher (1893, p. 66) reports that C. H. Merriam took an adult female at St. George, Utah, May 13, 1891. Tanner (1927, p. 198) reports it resident in the Virgin River Valley some years, he having taken it in December (B.Y.U. 238) and January. Presnall (1935, p. 203) speaks of it as nesting along the Virgin River south of Zion Park and refers to a specimen in the Zion Museum, taken by me in the orchards at Hurricane Fields in June, 1932, where two or three pairs appeared to have been nesting. Two specimens at the University of Utah constitute spring records: one (U.U. 212) was taken on the Beaver Dam wash, April 22, 1930; the other (U.U. 1430) at Hurricane, April 23, 1932, both in Washington County, Utah. In addition, Clifton Greenhalgh's field notes show that he observed one at Kanab, Kane County, April 25, 1935, on the Kanab Creek drainage into the Colorado River, altitude 4750 feet, definitely nearer the Upper than the Lower Sonoran Zone, presumably an overflow from the Lower Sonoran because of proximity to a suitable habitat.

Toxostoma bendirei. Bendire Thrasher. Out on the hot desert flats about ten miles southeast of Escalante, Garfield County, Utah, on May 9, 1937, the writer and two of his sons heard a strange bird singing in the scattered juniper trees skirting the edge of a sagebrush flat near the Escalante wash, altitude about 6000 feet. After considerable stalking, one of the boys was able to take the specimen which proved to be an adult male Bendire Thrasher (U.U. 4032). It was in company with mockingbirds which were also singing. No other thrashers were seen, however.

We were considerably mystified to find this supposedly Lower Sonoran bird in an Upper Sonoran desert, even though it was in a hot dry valley. It must have been a breeding bird and probably had a mate and nest near-by. During the summer of 1938, the writer had opportunity to get acquainted with the bird under similar habitat conditions across the Colorado River to the south in the Navajo country in northern Arizona on the Rainbow Bridge-Monument Valley expedition.

In the hot dry valleys between Tuba City, Coconino County, and Kayenta, Navajo County, Arizona, we took specimens of both adults and juveniles in family flocks during July. One of the interesting things we observed was the coexistence of three mimids in several different places, the Bendire Thrasher, the Western Mockingbird, and the Sage Thrasher. In some places there appeared to be two or three families of each kind. In one place in Klethla Valley, we found them concentrated in bushes near a small water seep where berries were available, but they appeared to be feeding largely upon small green moth caterpillars which were very numerous on the ubiquitous Russian thistles.

After studying the birds in these Upper Sonoran northern Arizona desert valleys, ranging from 5000 to 6500 feet altitude and finding them concentrated largely in areas where the desert scrub bushes were largest and thriftiest, it was not surprising any longer to have found a Bendire Thrasher across the Colorado River to the north in an almost identical habitat.

Clarence Cottam by letter of March 27, 1939, reports taking two specimens and observing many more in Monument Valley near the Utah-Arizona line, July 4, 1927.

Regulus satrapa olivaceus. Western Golden-crowned Kinglet. Although the Golden-crowned Kinglet appears to be a very common breeder in the boreal forests that are well distributed throughcut the mountains of Utah and a flocking winter resident of the foothills (altitudinal migration?), it is really surprising to find reference to the species missing from the early records for the state. Although its presence was known as early as 1908, the first reference I find in the literature is that by A. H. Miller (1934, p. 164) who observed them at 9000 feet in the dense tall spruces on the Escalante Mountains (Aquarius Plateau) in the Powell National Forest, Garfield County, and on the summit of the Wasatch Mountains east of Ephraim (10,000 feet), San Pete County, also in the tall spruces. Presnall (1935, p. 205) reports that occasional flocks may be seen at Zion Canyon, Washington County, at almost any point in the park above 4000 feet from late November to early March.

Clarence Cottam reports that the records of the U. S. Biological Survey show that in October, 1908, Dr. S. Osgood found them in the Henry Mountains, Garfield County, in the pinyon pines in Wayne County, and commonly in aspens and firs at Fish Lake Park, Sevier County.

The Treganzas report both the Ruby-crowned and Golden-crowned Kinglets plentiful in the Uinta and Wasatch Mountains, having devoted one summer exclusively to kinglet study, and having inspected 27 nests of this species. They also found them wintering in the Tintic Mountains.

J. L. and J. M. Mullen found the Golden-crowned Kinglet breeding in the tall spruces near Brighton in the head of Big Cottonwood Canyon, Salt Lake County, in 1922, 1928 and 1931. The first nest was found June 21, 1922, on the end of a conifer bough about 20 feet above ground; it contained nine partly incubated eggs. Another nest found on the same day had just been completed. The young ones in a nest found July 8, 1928, were so far developed that they flew from the nest when disturbed.

A nest with eight fresh eggs was found in Spanish Canyon, near Brighton, June 23, 1931. The nest on the end of a spruce bough, 50 feet up in the tree, was soft and bulky. It was composed of plant fiber, green moss, grass and hairs, and was lined with feathers and covered with spider webs. Three days later, another nest, 20 feet up in a spruce, contained ten partly incubated eggs.

A worn-plumaged male specimen (U.U. 2551) was taken July 26, 1935, near Duck Creek on Cedar Mountain, Kane County, 9000 feet, in the spruce-fir forest.

Spring and fall records include specimens taken on Castle Rock slope near Pine View in Ogden Canyon, Weber County (U.U. 5369), October 23, 1937; near Mud Lake sawmill in the La Sal Mountains, San Juan County (U.U. 1076); and at Mutual Dell, American Fork Canyon, Utah County (U.U. 1957).

The writer found them fairly common (ten seen, one taken, U.U. 4446), September 4, 1938, in the spruce-fir forest at the head of Mill Creek, near The Firs in Salt Lake County.

Records from the Brigham Young University indicate that seven specimens (B.Y.U. 685, 960, 961, 965, 994, 1165, 1166) were taken in Utah County, most of them in the canyons near Provo during the winter and spring from January 5 to April 22, in different years from 1929 to 1935.

The Christmas censuses taken by C. W. Lockerbie and the Utah Audubon Society at Salt Lake City show that one Golden-crowned Kinglet was observed in 1932, 10 in 1936, 10 in 1937, and 8 in 1938.

Clarence Cottam reports that he saw three young broods learning to fly in Cottonwood Canyon, Wasatch Mountains, Salt Lake County, August 4, 1936; he found them common at Mirror Lake and Crescent Lake in the Uinta Mountains as high as 11,000 feet, August 8, 1936, and saw one bird in the Beaver Mountains at 7500 feet on August 12.

Phainopepla nitens lepida. Phainopepla. This bird is so conspicuous that it could scarcely be overlooked if present, and yet Henshaw did not find it in 1872 at Toquerville and in the Virgin River Valley where it is a regular, though sparse breeder today. A. K. Fisher (1893, p. 113) reports it to have been common in the lower Santa Clara Valley, Washington County, Utah, June 11–15, 1891, where several pairs were breeding in St. George. Tanner (1927, p. 199) says it is a common summer visitant, breeding in May and part of June. Presnall (1935, p. 205) reports it as a rather uncommon summer visitant in Coal Pits wash in Zion National Park.

The writer has observed it during the breeding season at St. George, Hurricane, Toquerville, Rockville and Anderson's Ranch, all in the Virgin River Valley in Washington County, Utah, and has seen the young broods out of the nest in late June and early July in the latter two places. Specimens have been taken at Anderson's Ranch, June 28, 1932 (U.U. 1564) and July 5, 1932 (U.U. 1563, 1565). Clifton M. Greenhalgh's field notes indicate that he observed a bird at Kanab, Kane County, Utah, altitude 4750 feet, July 13, 1935. Whether this indicates breeding at this place is problematical since it may have been a bird that was wandering after the broods had dispersed.

Dendroica townsendi. Townsend Warbler. This warbler is probably a regular migrant passing over Utah and Arizona in small numbers, usually stopping at the higher altitudes along the way, which may explain why specimens are so scarce in collections. All of the available records are from late summer or fall. It seems peculiar that there should be no spring records among them.

Henshaw did not find it in Utah. Stanford took the first specimen in Utah (1931, p. 8) in the Henry Mountains, Garfield County, on September 12, 1929. Additional records by Stanford (1938, p. 142) include two immature specimens (U.S.A.C. 188, 189) taken at Logan, Cache County, September 27, 1930, and one (U.S.A.C. 335) at Dolomite, Tooele County, Utah, September 30, 1934. Presnall (1934, p. 56) reports observing a bird at Boat Mountain, Bryce Canyon National Park, Utah, October 7, 1933.

The records of the Rainbow Bridge-Monument Valley expeditions show that two birds were observed by H. N. Russell, Jr., August 13, 1935, on Navajo Mountain, San Juan County, Utah, near the Arizona line, and that an adult specimen (U.U. 4341) was taken in Beaver Creek Canyon at the north foot of the same mountain at 6000 feet altitude on August 10, 1936. A second specimen (U.U. 5189) was taken on the Kaiparowits Plateau across the Colorado River to the north in Kane County, Utah, 7000 feet, August 12, 1937, which seems to be the earliest record yet available.

The writer took an adult female (U.U. 4445) from aspens among the coniferous forest in the head of Mill Creek near The Firs, a summer home colony, Salt Lake County, Utah, 7200 feet, August 31, 1938.

Vermivora luciae. Lucy Warbler. This inconspicuous bird was missed in southwestern Utah by Henshaw and Tanner, but was reported by Fisher (1893, p. 117) as having been taken by C. H. Merriam May 11 and 13, 1891, in cottonwoods along the Santa Clara River and at a pond near St. George, both in Washington County, southwestern Utah (U.S.B.S. 141821 and 137622). Presnall (1935, p. 206) reported a pair seen May 15, 1935, at Shunes Creek, Zion National Park, Utah.

Clarence Cottam reports a skin (male) in the American Museum taken April 27, 1892, at Riverview in southeastern Utah by C. P. Rowley.

Additional records accumulated at the University of Utah corroborate status of this warbler as a breeder along the Virgin River, but also show that it overflows that drainage basin. The writer found it to be a very common songster in the cottonwoods on the Beaver Dam wash, Santa Clara Creek and the Virgin River during the first week after mid-April on two different years, 1930 and 1932. Specimens were taken in the Beaver Dam wash, April 22, 1930 (U.U. 234, 235), and April 18, 1932 (U.U. 1361), at the old smelter at Shem on the Santa Clara, April 17, 1932 (U.U. 1338), and at Virgin (town) on the Virgin River, April 22, 1932 (U.U. 1416). An additional specimen (U.U. 236) was taken April 22, 1930, in the Beaver Dam Mountains between the wash and Santa Clara Creek in tall brush, indicating that it is not confined to the cottonwoods. Two skins in the Dixie College collection are reported (Clarence Cottam) taken July 11, 1937, at St. George, an immature by Floyd Atkin and a female by Irvin McArthur. A sight record is recorded in Clifton Greenhalgh's notes at Kanab, western Kane County, Utah, April 28, 1931.

The Rainbow Bridge-Monument Valley expeditions revealed the Lucy Warbler to be a breeder along the Colorado and San Juan rivers in southeastern Utah. Specimens were taken on both sides of the Colorado River, one (U.U. 4351) taken on July 13, 1936, in San Juan County, another (U.U. 4352) on August 8, 1938, 41 miles above Lee's Ferry in Kane County, Utah, and a third specimen, lost during the exigencies of boating on the river, was an immature bird being fed by an adult, taken by the writer on an oak-covered bar on the Colorado River, Kane County, about two miles below the mouth of the San Juan, July 17, 1937.

Additional records of observations made by the writer and H. N. Russell, Jr., during a boating trip down the San Juan and Colorado rivers July 30 to August 11, 1938, show that the bird was seen on the San Juan 30 miles above the Colorado, San Juan County, Utah, and at the mouth of the Paria, one-half mile below Lee's Ferry, Arizona. Although we were especially looking for it, and carefully examined many of the brushy bars alongside the rivers, these were the only records. It appears to be either a rare inhabitant at that time of year, or very secretive.

Seiurus noveboracensis notabilis. Grinnell Water-thrush. The Grinnell Water-thrush appears in the light of the few records available to be an occasional migrant passing through Utah in May and in August. Not since 1891 has it been reported from Utah in the literature, although specimens have been taken as early as 1915. Fisher (1893, p. 122) reports a male taken at Santa Clara, in the southwest corner of Utah, May 11, 1891, by Vernon Bailey (U.S.B.S. 141802).

Two specimens from the Bear River Marshes in Boxelder County were taken by A. Wetmore, August 17, 1915 (U.S.B.S. 261450), and August 21, 1915 (U.S.N.M. 225756).

Charles W. Lockerbie reports an observation of a single bird May 15, 1932, at Fairmont Park in Salt Lake City.

The latest record available is a specimen (U.U. 1827) taken by the writer in open chaparral alongside a small stream near Bluff, San Juan County, May 11, 1933, just 42 years to the day after Bailey's first specimen.

Guiraca caerulea interfusa. Western Blue Grosbeak. H. W. Henshaw working in southern Utah in 1872 did not find the Blue Grosbeak. Fisher (1893, p. 106) reports that Dr. Merriam found the species common in the lower Santa Clara Valley, Utah, May 11 to 15, 1891. It was not listed by Tanner (1927). Miller (1934, p. 165) reports seeing two singing males in Zion Canyon on June 27, 1931. Presnall (1935, p. 208) reports three singing males in Zion Canyon in 1934.

A specimen in the University of Utah collection (U.U. 1576a) was taken at Springdale, in Zion Canyon, July 18, 1932, and another one (U.U. 1576) was taken at Rockville a few miles farther down the Virgin River on July 31, 1932. These records corroborate the earlier findings that they are breeding inhabitants of the thick willows of the streamsides.

Other records, however, indicate that the Blue Grosbeak is by no means confined to the Virgin River drainage in Utah. Clifton Greenhalgh found it at Kanab, western Kane County, 4750 feet, June 1 and 25, July 21, August 12 and 24, 1931, and October 15, 1935. (The writer found it here June 14, 1939.)

The Rainbow Bridge-Monument Valley expeditions found it along the Colorado River in Arizona between the Utah line and Lee's Ferry on July 17, 1936, and again on August 10 and 11, 1938. The birds were inhabiting the willow and tamarix streamside fringes along the banks. They were

found in 1938 at the mouth of Paria Creek near Lee's Ferry and on a bar 13 miles above the old ferry. Two families with young out of the nest were inhabiting the bar, about a half-mile in length.

In all probability the Blue Grosbeak extends along the brushy bars of the Colorado River into Utah, even though the expeditions did not find it. However, there is a specimen in the collection of the High School at Moab, Grand County, taken in an orchard at that place in April, 1936, definitely suggesting its extension up the river at least that far.

Loxia curvirostra. Red Crossbill. Some fourteen skins of crossbills were sent in the fall of 1938 to Ludlow Griscom, who kindly identified them. The lot contained 2 skins from Navajo Mountain, San Juan County, Utah; 8 skins from near Navajo Lake on Cedar Mountain, Kane County, Utah, about 100 miles northwest of Navajo Mountain; and 4 skins from Black Mesa, Navajo County, Arizona, about 100 miles southeast of Navajo Mountain.

Of the Arizona specimens from Black Mesa, two proved to be non-typical *bendirei* (U.U. 4445, 4446) and the other two *grinnelli* intergrading toward *benti* (U.U. 4447, 4448), all probably vagrants. On July 16, 1938, I noted a flock of six flying south over the mesa toward a grove of western yellow pines a mile or two distant where H. N. Russell, Jr., obtained the four specimens a few minutes later.

Of the Navajo Mountain specimens from Utah, one was a typical *bendirei* female (G.C. B373) taken August 13, 1935, and the other was a typical *stricklandi* (G.C. B369) taken August 12, 1935. This latter specimen was recorded by Griscom (1937, p. 147) from Navajo County, Arizona, due to a misunderstanding of the collector about the location of the Utah-Arizona line; the error was not corrected until a year or two after Mr. Griscom had first seen the specimen.

Of those from Cedar Mountain in Utah, four specimens (U.U. 1758, 1759, 1760, 1761) taken July 29, 1935, also proved to be *stricklandi*. The other four specimens (U.U. 1763, 1765, 1766, 1767) proved to be like two of the Black Mesa specimens, *grinnelli* intergrading toward *benti*. Mr. Griscom comments that they had probably bred near where they were collected. I recall that there appeared to be juveniles in the flock from which they were taken.

An additional specimen (U.U. 5476), having a bill of the length and curvature of *stricklandi*, and the width and depth of base similar to *bendirei*, taken in a grove of yellow pines at the south foot of La Sal Mountains, April 8, 1938, was pronounced by Griscom to be an extremely long-billed member of the *benti-grinnelli* complex from northern Arizona, Nevada, and Utah.

Other records of Red Crossbills in Utah include the following. A male (U.S.B.S. 205877) of *L. c. bendirei* taken by W. H. Osgood on Beaver Mountain, Beaver County, August 17, 1908. Three specimens (B.Y.U. 1615, 1616, 1617) from Elk Park, Uinta Mountains, Daggett County, were determined by H. C. Oberholser as *L. c. bendirei*. Hayward (1931, p. 152) reports crossbills in the Uinta Mountains. Presnall (1934, p. 57) reports *bendirei* at Bryce Canyon National Park and (1935, p. 208) on the east rim of Zion Canyon. Miller (1934, p. 166) reports *bendirei* near Fish Lake, Sevier County, and on the summit east of Ephraim, San Pete County. Griscom (1937, p. 170) reports additional records of *bendirei* in the Beaver Mountains (Tushar Range), Beaver County, and *benti* (reported by Miller as *bendirei*) at Cedar Breaks and in the Escalante Mountains. Stanford (1938, p. 144) reports a specimen of *bendirei* (U.S.A.C. 264) taken at Logan Canyon, Cache County, March 25, 1933.

Zonotrichia querula. Harris Sparrow. Utah appears not to be on the regular route of migration of the Harris Sparrow and its occurrence in the State would scarcely be expected on anything more than an accidental basis, especially in light of its accidental occurrence in Arizona as reported by Monson (1937, p. 295).

Records and observations accumulating in Utah indicate that for two winters, 1936-37 and 1937-38, small numbers were wintering in the valley of Great Salt Lake. The earliest report of this bird is by Ellis R. Wilson of Centerville, Davis County, Utah, as of January 1, 1937, when he first recognized that some of the sparrows feeding in his yard with the Gambel Sparrows were different. About a month later he found one dead and brought it in to the University of Utah for determination on February 9, 1937. It proved to be a first-year female, with white throat and scaled crown. Mr. Wilson reported that other Harris Sparrows were observed at his feeding grounds from time to time until March 15, by which time the black on the crown, throat and chest was becoming more conspicuous. Stanford (1938, p. 145) reports that a specimen (U.S.A.C. 475) was taken April 17, 1937, from Wellsville, Cache County, Utah, indicating its occurrence in at least two different places in the Great Basin that winter.

Mr. Wilson's notes for the winter of 1937-38 indicate that the Harris Sparrows were first observed on December 24, 1937, after a fresh fall of two inches of snow. Further notes indicate that they were observed on March 14, 1938, after fifteen inches of snow, and on April 13, with a note that they were much darker on the throat and breast, and again on April 18, with a note "Harris sparrow still here,

head and throat largely black now." Mr. Wilson was under the impression that there were several birds around the farm.

These observations are corroborated by Mr. Charles W. Lockerbie who visited the Wilson farm at Centerville February 21, 1937, and again February 23, 1938. On his first visit, he found three or four singly among the Gambel Sparrows but was not certain that some of the observations were not duplicates. He remarks in his field notes that the black was becoming quite marked on the breast and throat.

On his second visit his field notes indicate that he had a fair observation of two among the Gambel Sparrows in the oak brush. The birds did not reappear at the Wilson farm during the winter of 1938-39.

LITERATURE CITED

Bailey, A. M., and Niedrach, R. J.
1938. Red phalarope and ruddy turnstone in Colorado. Condor, vol. 40, p. 227.
Fisher, A. K.
1893. Report on the ornithology of the Death Valley Expedition of 1891, [etc.]. N. Amer. Fauna, no. 7, pp. 7-158.
Griscom, L.
1937. A monographic study of the red crossbill. Proc. Boston Soc. Nat. Hist., vol. 41, pp. 77-209.
Hayward, C. L.
1931. A preliminary list of the birds of the subalpine and alpine zones of the Uintah Mountains. Proc. Utah Acad. Sci., vol. 8, pp. 151-152.
1937. Some new and unusual bird records from Utah. Wilson Bull., vol. 39, pp. 303-305.
Miller, A. H.
1934. Field experiences with mountain-dwelling birds of southern Utah. Wilson Bull., vol. 46, pp. 156-168.
Monson, G.
1937. Unusual sparrow records from Arizona. Wilson Bull., vol. 39, pp. 294-295.
Oberholser, H. C.
1899. Ornis Bulletin du Comité Ornithologique International, pp. 1-16.
Presnall, C. C.
1934. Animals and birds of Bryce Canyon National Park. Zion and Bryce Nature Notes, vol. 6, pp. 52-57.
1935. The birds of Zion National Park. Proc. Utah Acad Sci., Arts, Letters, vol. 12, pp. 197-210.
Stanford, J. S.
1931. Records of birds in central and southeastern Utah. Bull. Univ. Utah, vol. 21, no. 8, pp. 1-10.
1938. An annotated list of the birds In [sic!] the U.S.A.C. Zoological Museum. Proc. Utah Acad. Sci., Arts, Letters, vol. 15, pp. 135-146.
Stevenson, J. O.
1937. The red phalarope in Texas. Condor, vol. 39, p. 92.
Tanner, V. M.
1927. Notes on birds collected in the Virgin River Valley of Utah. Condor, vol. 29, pp. 196-200.

University of Utah, Salt Lake City, April 20, 1939.

FROM FIELD AND STUDY

Ivory-billed Woodpecker's Beak in an Indian Grave in Colorado.—A WPA crew excavating near Johnstown, Weld County, Colorado, last January unearthed two human skeletons, male and female, probably either Arapaho or Cheyenne Indians. With the skeletons were various pieces of trade goods secured from whites, showing the remains were not of very great age; but of interest to bird students were the bills of an Ivory-billed Woodpecker (*Campephilus principalis*) and a Pileated Woodpecker (*Ceophloeus pileatus*). As there was no direct contact of the plains Indians with those of the Gulf coast area, it is probable that the beaks changed hands several times before reaching Colorado.

W. Z. Parks (Northwestern University Studies in the Social Sciences, no. 2, 1938) states that specific animals were thought by the northern Shoshone to be useful in curing specific diseases. Eagles were associated with fevers, bears with open and bloody wounds, and woodpeckers with venereal diseases. According to Parks, head-dresses of woodpecker scalps were worn by the Klamath and Shasta shamans, and in California they were donned by dancers participating in Yurok and Hupi jumping dances. Consequently, from the above, it may be judged that the finding of woodpeckers' beaks in Indian graves should not be unusual, except for the geographic location of the find of a portion of an Ivory-billed Woodpecker upon the Colorado plains.—ALFRED M. BAILEY, *Colorado Museum of Natural History, Denver, Colorado, March 24, 1939.*

European Jack Snipe and Franklin Gull in California.—On November 20, 1938, while shooting Wilson Snipe about four miles northwest of the Marysville Buttes, Butte County, California, I saw an unusual snipe get up in front of me. The bird appeared small and did not fly in a zig-zag erratic flight, nor did it give any call upon rising. I shot the bird and discovered it to be a female adult European Jack Snipe (*Lymnocryptes minimus*). I believe that this is the first record for the United States proper, and the third one for North America, one having been taken on the Pribilof Islands and one in Labrador. This specimen is now in my collection.

On May 18, 1939, while checking the southwest end of Tulare Lake, Kings County, for possible duck disease, I collected a female immature Franklin Gull (*Larus pipixcan*) that was in company with a number of immature Ring-billed Gulls and a few California Gulls. There were also a few Bonaparte Gulls on a sand spit. It was easy to distinguish this species from the Bonaparte because of the lack of a large amount of white on the primaries. The birds were feeding on carp that had died in a barrow pit along the southwest border of the lake. This particular bird was changing from the first winter plumage to the first breeding plumage. It is, therefore, a rather interesting specimen.—D. D. MCLEAN, *Division of Fish and Game, San Francisco, California, May 20, 1939.*

The House Finch in the Willamette Valley, Oregon.—In April, 1937, at Corvallis, Oregon, two pairs of House Finches (*Carpodacus mexicanus frontalis*) for a time came regularly to the same feeding table as purple finches and sparrows. Later in the spring, House Finches were seen about Corvallis, and at least one pair nested on the campus. In the last two years this has become a fairly common bird on the campus and it has been seen in the surrounding country. I have also seen it at Eugene, and have had unverified but quite circumstantial reports of it from other towns in the valley. In the past it has not been recorded in western Oregon north of the Rogue and Umpqua river valleys.—KENNETH GORDON, *Department of Zoology, Oregon State College, Corvallis, Oregon, May 15, 1939.*

Notes on the Distribution of the Lesser Canada Goose and Cackling Goose in California.—*Branta canadensis leucopareia.* Lesser Canada Goose. Of the several kinds of geese wintering in California, this is the latest to arrive in autumn. Its migration appears to be largely inland, in contrast with the more coastal flights of Cackling Geese, and Lesser Canada Geese enter the state in its northeastern corner or along the eastern border.

On account of confusion with the much more abundant Cackling Geese at Tule Lake, Siskiyou County, H. M. Worcester (MS) records the present subspecies definitely in the autumn of 1932, first on December 3, and common by the 5th. It is probable that some Lesser Canadas were present earlier. His notes for the same season record large numbers arriving at the Refuge, which was then solidly frozen over, on December 15, 17, and 20. About 2000 were present December 27, but all had departed by January 2, 1933. I observed no Lesser Canada Geese among thousands of Cackling Geese at Tule Lake on November 29, 1933. Worcester (MS) noted the first Lesser Canadas for the spring of 1933

as arriving here on March 6. The next day, Dr. J. C. Phillips and I found about 5000 present. On March 9, 1933, we saw several thousand of these geese migrating north along the South Fork of Pit River, between Likely and Alturas, Modoc County, where I saw several hundred moving similarly as late as April 23, 1931.

R. D. Murphy provides no early dates for arrival at Honey Lake. The earliest is December 3, 1932, when he recorded a few flocks as appearing. These left on the 13th during a blizzard with other kinds of geese save Canadas, and none has been observed to winter there. A specimen in the L. B. Bishop collection in Los Angeles was taken on the Murphy Ranch, near Honey Lake, December 9, 1930. Dr. Phillips and I saw about 2500 Lesser Canada Geese in Honey Lake Valley, March 10, 1933. In the period March 16-19, 1939, very few, not more than 100 all told, Lesser Canada Geese were observed here.

My earliest autumn record for the Sacramento Valley is of a specimen collected near Willows, Glenn County, November 20, 1928. Only nine individuals were seen that day, but the form was abundant by early December. On November 22, 1938, these geese were numerous about Willows and near Butte Creek, Sutter County, when several specimens were taken. Lesser Canada Geese usually are numerous in the Sacramento Valley by the last week in November. From early December to January they are among the most abundant of the geese, their numbers probably exceeding those of Cackling Geese and approximating those of White-fronted and of Lesser Snow geese. About mid-January, these and most other geese depart from the Valley, probably on account of food shortage, when great numbers are to be found on the grassy plains from Davis, Yolo County, to Rio Vista, Solano County, and in the San Joaquin Valley. At this period in some seasons, especially in dry ones when new grass is scant, as in the present year, geese may be relatively scarce in the Sacramento Valley, where very few were noted February 25-26, 1939. On the latter date, many thousands were observed near Davis. This movement has also been observed in other years. The geese return to the Sacramento Valley on the spring migration during March, but they do not remain for long, and press northward. The Pit River Valley, as above indicated, appears to be a heavily used migratory path. It is probably reached from the Sacramento Valley by the low mountain gaps north of Lassen Peak and leads northward to the easterly route followed by this form, east of the Cascades of Oregon.

The Lesser Canada Goose is now rare on the Suisun marshes, Solano County (Moffitt, Condor, vol. 40, 1938, p. 83), where recorded as abundant in 1852 (Heermann, Pac. Railroad Rept., vol. 10, part 6, no. 2, 1859, p. 67), and in the San Francisco Bay region (Grinnell and Wythe, Pac. Coast Avif. No. 18, 1927, p. 58, as *Branta canadensis hutchinsii*).

North of the Tehachapi, the Lesser Canada Goose is now preëminently a bird of the inland valleys and plateau lakes and meadows, and it is rare along the sea coast. I have examined a typical specimen in the collection of Dr. B. M. Marshall of Eureka that was shot near Arcata, on Humboldt Bay, in 1914.

This can be reckoned as one of our most abundant geese, but it is a late arrival and is numerous only from late November to early April.

Branta canadensis minima. Cackling Goose. Lincoln (Condor, vol. 28, 1926, pp. 153-156) has satisfactorily worked out this form's migration route, which follows the coast south to Oregon, thence mainly through the Willamette Valley to Tule Lake, California. His earliest seasonal return for a banded bird from Tule Lake was October 24. Worcester's notes (MS) indicate that these geese reach this point in numbers considerably earlier than Lincoln's record suggests. In 1931, thousands of Cackling Geese were present on October 4. The lake froze up on November 19, but the birds persisted in numbers until December 8, when many left, but the last, not until after Christmas. In 1932, first seen in autumn on August 30, thirty-five individuals, then not again until September 10, when about 2000 appeared, after which date they increased rapidly until abundant by October 30. Most left before December 15, but some were present on the 27th, and all had departed by January 2, 1933 (Worcester MS). This is by far the most abundant kind of goose on Tule Lake, where at least 50,000 were observed by me on November 29, 1933. The spring migration is apparently considerably later than that of the Lesser Canada Goose, just as its fall migration is much earlier, for we found no Cackling Geese at Tule Lake on March 7, 1933.

I could secure no valid record of this little goose's occurrence in the Pit River Valley of Modoc County, and it appears to be unknown in Honey Lake Valley, which bears out the coastwise nature of its migration. Apparently the birds go no farther inland than Tule Lake in northern California, thence south to the Sacramento and San Joaquin valleys to winter.

That the form arrives in numbers at Tule Lake before individuals reach the Sacramento Valley is indicated by the fact that my earliest autumn record for the latter area is of about 100 birds seen near Willows, October 14, 1928. Extensive travels over the greater part of the Valley in the next three days failed to reveal presence of any Cackling Geese, although White-fronted Geese were fairly

common, with a few Lesser Snow Geese in evidence. On October 27, perhaps a thousand Cackling Geese were seen in flocks south of Colusa and two birds were collected. The next day more were found near Willows, and two more were taken. By November 20, 1928, Cackling Geese were abundant about Willows; over 10,000 were seen and 120 shot by gunners I accompanied. The birds were then abundant elsewhere in the Valley and continued so through at least January 12, 1929. No Cackling Geese were seen in a visit to the Butte Creek area, or in the vicinity of Willows, February 16-17, 1929, although a thousand Lesser Canada Geese were noted in the first locality. March 3, 1929, a single flock of 15 Cackling Geese was observed in flight near Butte Creek with flocks of Lesser Canada Geese totalling 300 birds. Scarcity of the birds at this season is comparable to experiences with other geese of the region. From March to early April, huge numbers of Cackling Geese have been observed in the fields of the delta region west of Sacramento and south of Davis, Dixon and Elmira.

The autumn arrival of Cackling Geese in the Sacramento Valley in 1929 was much as in the preceding season. On October 31 only five to six thousand were found about Colusa. The birds were extremely abundant about Willows by November 3. Here, the abundance of Cackling Geese at periods of heavy concentration belies attempts at census taking. The birds were always found most abundant on the 12,000-acre Spalding Ranch, now a Federal Wildlife Refuge. Here, in November, 1928, I once saw a solid cloud of Cackling Geese arise at daybreak, that extended at least four miles across the horizon; certainly many hundred thousand birds were involved. Geese remained abundant in the Valley through December, 1929, but a decided reduction in numbers was observed on January 12, 1930, when few of any kinds were seen. March 30, 1930, only 20 Cackling Geese were encountered among about 2,000 Lesser Canada Geese noted on the Spalding Ranch.

The area of winter habitation of the Cackling Goose in California is similar to that of the Lesser Canada, with the metropolis in the Sacramento-San Joaquin Valley; but there is no evidence that the present subspecies now migrates to southern and southeastern California, as does the Lesser Canada. Cackling Geese are now rare on the Suisun marshes and San Francisco Bay, in fact anywhere along the coast. I have seen typical examples taken on Humboldt Bay, in the collections of C. I. Clay and Dr. B. M. Marshall, of Eureka. Evidence that there is a small but regular (formerly large) migration down the coast to the vicinity of Eureka, thence inland, up the Trinity and Eel river valleys, probably east to the Sacramento Valley, was provided by the late F. J. Williams, of Ferndale, Humboldt County, who stated he had for years observed such autumnal flights, now much reduced in numbers.

The Cackling Goose is about fourth in point of numbers of the kinds wintering in California, being exceeded by Lesser Snows, White-fronts and Lesser Canadas. It is an abundant bird on Tule Lake from early October to December, and in the central valleys from late October to early April.—JAMES MOFFITT, *California Academy of Sciences, San Francisco, May 15, 1939.*

"The Mississippi Kite in Spring."—The fine paper of this title by George Miksch Sutton (Condor, vol. 41, 1939, pp. 41-53), like all work of this well-known ornithologist and artist, is a valuable contribution. But rewording of the last four paragraphs with greater accuracy in view could easily have improved the paper.

That "black picture" of oologists has absolutely astounded me! I am an ardent oologist of over fifty years' field experience and have been personally acquainted with numerous collectors of eggs. Being a western oologist who has never collected a bird or egg of this fine species and with but two sets of the eggs in my collection, I feel that I am qualified and should make some defense of the oologist. If I were not reasonably certain that I had done no harm by collecting eggs, I certainly would try to make my studies without collecting.

It has never been my misfortune to meet any oologist in these United States who would behave as claimed in these four questionable paragraphs. On the other hand, I have found them to be eager conservationists, serving all of us in the protection of the hawks, owls, and other birds which have so often been persecuted. They are busy with their cameras, instead of guns, and you will find them helping to direct boy scouts, teachers, and others in bird study. They seldom kill a bird, as they well know that this is not apt to be conservation. They also know that the taking of a few sets of eggs will do no harm, as the birds will normally in almost every case soon have another set. They would be the first to give protection to the Mississippi Kite and would be the first to detect any threatening danger to that bird.

What has our friend Sutton done to help the Mississippi Kites around Arnett? KILLED SIXTEEN BIRDS! On the premise that these birds were of average age and that they nest each year after they are one year of age and up to the age of ten years, we find that the killing of these sixteen birds would in only ten years be equal to 400 sets of eggs for only the first and second generations of birds. Why figure the third or more generations? The figure is large enough without doing so!

It will be well for all of us to base our papers on facts and not to condemn all scientists in any branch because of some single representative who is a "black sheep"; for we can find such in any class.—WILSON C. HANNA, *Colton, California, March 29, 1939.*

Old-squaw and American Scoter in San Diego Region.—Mr. J. W. Sefton, Jr., has recorded (Condor, vol. 41, 1939, p. 83) the first capture of an Old-squaw (*Clangula hyemalis*) in southern California since 1921. Even though his note is not concerned with sight records of this species, the implied rarity of the Old-squaw at San Diego may justify the publication of two very satisfactory observations of the bird from my own notes. On March 18, 19, and 20, 1928, a bedraggled individual, in an indefinite plumage but approaching that of the adult female, was seen on the edge of the "Strand" in San Diego Bay near Coronado. This bird was most unsuspicious, and since I have been familiar with the Old-squaw since my childhood, the record was as positive as a sight record can ever be.

On June 20 and 21, 1937 (and therefore slightly more unusual a record than the above), another very dishevelled Old-squaw was seen in San Diego Bay, in an obscure buffy plumage frequently found in summering birds in the East. It also was very tame, and spent most of its time on shore, within a few yards of the spot where the 1928 bird was noted. It seemed to be in unhealthy condition.

My notes contain references to other northern ducks in the San Diego region, but none seems worth giving in detail except the following, since they concern such species as the American Golden-eye and Red-breasted Merganser. On March 27, 1928, a female American Scoter (*Oidemia americana*) was observed with great care from a short distance as she fed in the surf just off the breakwater at Coronado in company with many Surf Scoters. This bird was observed almost daily until April 18, when I left California. On April 6 she was joined by an adult male in excellent plumage, and this individual also remained at Coronado until my departure. Even had this unmistakable male bird failed to appear, the female American Scoter is more easily identified at sight than females of either of the other two species when the birds are resting on the water and the white wing-patch of *Melanitta deglandi* scarcely visible. Like the Old-squaw, the scoters are extremely abundant winter ducks on Long Island, New York, and I have known them all well for many years.

Although the attitude of western ornithologists is more conservative toward sight records than that of the easterners, the observations cited above should not, it seems to me, invoke more than a minimum of uncertainty in the minds of even the most cautious.—WILLIAM TOD HELMUTH, III, *East Hampton, New York, April 9, 1939.*

Some Unusual Arizona and New Mexico Bird Records.—The following records were obtained in the course of field observations made during the period September, 1936, to December, 1938, inclusive, by the writer on the Navajo and Hopi reservations in Apache, Navajo, and Coconino counties, northeastern Arizona, and in parts of McKinley, Valencia, and San Juan counties in northwestern New Mexico. Most of these records represent the first published occurrences of the species in the respective parts of these two states.

Haliaëëtus leucocephalus. Bald Eagle. An adult observed October 29, 1937, at Long Lake in the Lukachukai Mountains, New Mexico; Transition Zone.

Pandion haliaëtus. Osprey. One flying over the San Juan River at Farmington, New Mexico, October 7, 1938.

Dendragapus obscurus. Dusky Grouse. A pair seen in Lukachukai Mountains above Sanastee, New Mexico, October 26, 1937. This big upland game bird is rare in these mountains that lie along the New Mexico-Arizona state line. Seen in forest of aspen, Douglas fir, and ponderosa pine.

Numenius americanus. Long-billed Curlew. One seen August 3, 1938, at a small reservoir near Mexican Springs, New Mexico; another August 11, 1938, at Ganado Lake, Arizona.

Limnodromus griseus. Dowitcher. One seen at a small reservoir near Bodaway House, about ten miles southwest of Gap Trading Post, Arizona, March 24, 1937. Still in gray plumage.

Lobipes lobatus. Northern Phalarope. One observed at an almost frozen-over pond about eight miles north of Sanastee, New Mexico, November 19, 1937. This, the only record I have for the species, is apparently an unusually late one.

Chlidonias nigra. Black Tern. A flock of six flew over Ganado Lake, Arizona, August 11, 1938.

Coccyzus americanus. Yellow-billed Cuckoo. One seen and others heard at Waterflow, New Mexico, July 20, 1938. Waterflow is in an irrigated district, with many cottonwoods and other trees.

Asio flammeus. Short-eared Owl. One observed September 30, 1938, near Egloffstein Butte, about twenty miles southwest of Keams Canyon, Arizona; Upper Sonoran grassland.

Megaceryle alcyon. Belted Kingfisher. One seen September 25, 1936, at Laguna Creek Dam near Dinnehotso, Arizona; another on October 9, 1937, near a small lake in the Lukachukai Mountains above Crystal, New Mexico.

Tyrannus tyrannus. Eastern Kingbird. One seen at Shiprock, New Mexico, on July 27, 1938. This is the first New Mexico record west of the Rio Grande, although the species has been observed several times in northeastern Arizona.

Iridoprocne bicolor. Tree Swallow. Four seen near Aztec, New Mexico, April 27, 1937. Allan R. Phillips (in letter) reports seeing three tree swallows about ten miles north of Gallup, New Mexico, on May 5, 1937.

Riparia riparia. Bank Swallow. Four seen flying over Pueblo Colorado wash at Ganado, Arizona, August 11, 1938, and one flying over reservoir at Snake Butte, about fifteen miles southwest of Keams Canyon, Arizona, September 30, 1938.

Pica pica. Black-billed Magpie. One observed September 19, 1936, at Tees-nos-pas, Arizona. Tees-nos-pas is only a few miles air line from the San Juan River in southeastern Utah and northwestern New Mexico, where the magpie is locally common; so this record is not unexpected. Arizona, except for this one locality, is completely out of the normal range of this species.

Cinclus mexicanus. Dipper. One seen along Lukachukai Creek in Lukachukai Mountains, Arizona, June 24, 1938, and two along headwaters of Whiskey Creek in Lukachukai Mountains, New Mexico, October 11, 1937.

Bombycilla cedrorum. Cedar Waxwing. Two seen May 8, 9, 11, and 12, 1937, at Keams Canyon, Arizona, feeding on apple blossoms. Individual birds were seen May 23 and June 7, 1937, at the same locality. One observed at Gallup, New Mexico, October 18, 1938.

Phainopepla nitens. Phainopepla. One adult male seen June 24, 1937, at Keams Canyon, Arizona.

Dendroica caerulescens. Black-throated Blue Warbler. A male observed October 9, 1938, in Milk Ranch Canyon near Fort Wingate, New Mexico. This is the second record for New Mexico, and the first west of the Rio Grande Valley. It is interesting to note that the other record was made at almost exactly the same time of year, October 8, 1904, at Gallinas Mountain, by J. H. Gaut (see Bailey, Birds of New Mexico, 1928, p. 615).

Seiurus noveboracensis. Water-thrush. One seen May 15, 18, 19, 20, and 22, 1937, at Keams Canyon, Arizona, all probably the same individual. One also seen in Milk Ranch Canyon near Fort Wingate, New Mexico, September 8, 1938.

Icteria virens. Yellow-breasted Chat. Adult seen at Keams Canyon, Arizona, October 12, 1938.

Icterus parisorum. Scott Oriole. Two males seen May 20, 1937, at Wildcat Mesa, ten miles northwest of Keams Canyon, Arizona. One adult male seen with almost fully-grown juvenile, July 14, 1937, in Hopi Buttes, near Na-ah-ti Trading Post, Arizona. Both records are from open piñon-juniper woodland.

Molothrus ater. Cowbird. Flock of five at Keams Canyon, Arizona, June 24, 1937, and a pair at Jeddito, Arizona, June 30, 1937.

Guiraca caerulea. Blue Grosbeak. One seen July 20, 1938, at Waterflow, New Mexico, in cottonwood grove.

Passerina amoena. Lazuli Bunting. One observed May 15, 1937, another June 30, 1937, both at Keams Canyon, Arizona. I was present at Keams Canyon between these two dates, but saw no other birds of this species. Later in the season, two were seen August 24, 1938, at Oraibi, Arizona, and two August 28, 1937, at Keams Canyon.

Hesperiphona vespertina. Evening Grosbeak. Several small flocks (thirty-five individuals in all) seen December 6 to 8, 1938, at Fence Lake, New Mexico, about seventy miles south of Gallup, New Mexico. The birds were feeding on juniper berries.

Spinus tristis. American Goldfinch. One male and two females seen May 28, 1937, and a pair on June 4, 1937, at Keams Canyon, Arizona.

Pipilo fuscus. Brown Towhee. Several observed June 2 and June 16, 1938, at Schillingburg's Trading Post, about ten miles west of Crownpoint, New Mexico. Also one September 2, 1938, at Barth's Jaralosa Ranch, about twenty miles south of Zuni, New Mexico, and three on December 13, 1938, about ten miles southwest of Gallup, New Mexico. Apparently a rare bird in northwestern New Mexico; I have never met with it in northeastern Arizona.

Calamospiza melanocorys. Lark Bunting. Adult male seen May 13, 1937, at Wildcat Mesa, ten miles northwest of Keams Canyon, Arizona. None seen in northeastern New Mexico.

Spizella arborea. Tree Sparrow. Three seen January 19, 1937, and two on February 19, 1937, at Moenave, near Tuba City, Arizona. Also one seen near Newcomb's Trading Post, thirty miles south of Shiprock, New Mexico, November 9, 1937.—GALE MONSON, *311 East Green, Gallup, New Mexico, February 1, 1939*.

Food Consumption of a Sparrow Hawk.—At Norris, Tennessee, we received a wounded Sparrow Hawk *(Falco sparverius)* which a CCC crew had found lying in the woods. The bird, a male, had evidently been shot. The right wing was injured, as well as the right side of the head, and the

right eye was blind. It was in a weak condition when given to us on December 11, 1937. It weighed 86.7 grams with the stomach empty. Its weight on January 31, 1938, totaled 113.8 grams, the stomach again empty. When first received, it breathed at the rate of 38 inhalations per minute.

We kept the bird on a screened porch, 10 feet by 14 feet in dimensions, and allowed it to move about at will at all times. At first it was too weak to feed itself and was fed small pieces of meat by means of forceps. Two days later it had recovered sufficiently to pick at meat placed in front of it but was not strong enough to tear off any pieces. Gradually, however, it grew stronger and able to feed itself. On the 19th of December it was able to fly a little and on the 23rd seemed fully recovered.

On December 14, a pan of water and a small pile of gravel were set out for the bird. Although it was never observed to touch either of these, on the 15th a quantity of gravel was found in the pan of water. The hawk ate mice, House Sparrows and beef; it refused pork and would not touch beef kidney. Unadulterated ground beef it consumed readily; but when the beef contained a slight garlic flavor, the bird ate it with some show of reluctance.

We kept several records of the consumption of lean beef in order to learn how much food it needed. The supply of beef was weighed before being put out each morning, the amount provided always ample and greater than the amount consumed. Each night, after the hawk had gone to roost, the amount remaining was weighed and the consumption computed. Only those days preceded by wholly beef-eating days are presented in the following table. The computations of the calories consumed are based upon the assumption that a gram of lean beef contains 1.76 calories.

Date	Consumption (grams)	Calories	Departure from the mean
Dec. 24	22.1	38.9	— 4.7
25	22.5	39.6	— 4.0
26	23.1	40.7	— 2.9
27	22.6	39.8	— 3.8
28	15.9	28.0	—15.6
29	19.1	33.6	—10.0
30	39.9	70.2	+26.6
31	32.7	57.6	+14.0
Jan. 1	21.4	37.7	— 5.9
2	28.9	50.9	+ 7.3
3	23.4	41.2	— 2.4
4	25.8	45.4	+ 1.8
5	17.7	31.2	—12.4
12	29.1	51.2	
13	30.1	53.0	
14	22.9	40.3	
15	21.6	38.0	
18	34.9	61.4	
21	23.5	41.4	
22	16.4	28.9	
23	18.0	31.7	
28	35.8	63.0	
Feb. 2	17.3	30.4	
11	27.6	48.6	
12	27.2	47.9	
Mar. 25	25.0	44.0	
Mean	24.8	43.6	

Four computations of single meals were also obtained:

Feb. 12	9.1 grams
Mar. 16	7.2 grams
Mar. 25	7.8 grams
Apr. 7	7.4 grams
Mean	7.9 grams

The thirteen consecutive record-days between December 24 and January 5 are interesting in that the accumulated negative departures from the mean reached 41.0 calories on the 29th but were balanced on the 30th and 31st by positive departures from the mean amounting to 40.6 calories. In other words, the hawk ate less than his average during the six days and then made up for this partial

abstinence on the two succeeding days. Indications of similar behavior appear in the few other consecutive record-days. This suggests that there may be normal physiological accumulations and deficiencies which are balanced by subsequent decreases and increases in the food intake. It may also suggest an explanation for the apparent tendency among animals to eat sparingly sometimes and to gorge themselves at other times when food is abundant.

The average daily consumption of food during the period of observation, when the thermometer ranged from 15 to 70 degrees above zero Fahrenheit, was 24.8 grams or 20.9% of the presumed normal body weight of 113.8 grams. The single-meal average consumption of 7.9 grams was 6.9% of the same body weight. The average number of calories per day was 43.6. The average number of calories per gram of body weight per day was .383 calories.

It may be of interest to note that the caloric consumption of this hawk, whose activity was slight (compared with that of a normal bird of the same species), amounted to nearly twelve times the .032 calories per gram of body weight per day consumed by a human being whose relative activity may be considered analogous.—Leonard Wing and Anne Hinshaw Wing, *205 Prospect Street, New Haven, Connecticut, April 18, 1939.*

Starlings Arrive in Utah.—Thirteen Starlings *(Sturnus vulgaris)* were discovered feeding with a flock of Brewer Blackbirds about the corrals on the Jeremy ranch, in Salt Lake County, by Mr. Thayer Evans, February 26, 1939. Mr. Evans killed one of the birds for identification, mounted it, and presented it to the University of Utah. I observed these birds on several occasions thereafter. Their attitude was decidedly like that of a meadowlark rather than that of a blackbird. The short tail, quick wing beat, and long glides to alight, are characters that differentiate them when in a flock of Brewer blackbirds.—C. W. Lockerbie, *Salt Lake City, Utah, April 15, 1939.*

A Pacific Kittiwake Comes Inland.—On February 16, 1939, during my absence from the city, Alva Oakes, of the Oregon Audubon Society, called at my office and left a very good written description of a gull-like bird he had found apparently sick on a sandbar on the south bank of the Columbia River in Multnomah County, Oregon. Two days later, Mr. Oakes again called and repeated his description of the bird that he had picked up and carefully examined. When I told him that I believed he had seen a Pacific Kittiwake, a species not before recorded in Oregon from any other than seashore localities, he returned to the Columbia River and found the bird dead at the exact spot where he had seen it before. The area is overrun with house cats, dogs, and small boys, but the bird had not been molested in any way; thus *Rissa tridactyla pollicaris* has been added to the birds of the Portland, Oregon, area. On being dissected, it was found to be an adult male in much emaciated condition.—Stanley G. Jewett, *Portland, Oregon, March 22, 1939.*

Geographic Variation in the Fork-tailed Petrel.—Recent acquisition by the Museum of Vertebrate Zoology of two series of specimens representing the species *Oceanodroma furcata,* one series from the southern limit, the other from near the northern limit of its range, demonstrates the existence of a readily appreciable geographical variation. The differences seen between northern and southern populations seem sufficient to warrant the use of separate names to indicate them.

The Fork-tailed Petrel was first formally named by Gmelin in 1789 as *Procellaria furcata,* based on an English description published four years before by Pennant in his Arctic Zoology. Both these authors indicate the icy waters between Asia and America as the bird's range, and Pennant, in the descriptive part of his Zoology, records the sighting of these petrels northeast of "Kamtschatka" on Cook's voyage to that region. It is therefore clear that the type locality for the name *furcata* is Bering Sea; this name is thus to be used for the northwestern population.

In reviewing the literature, the only old name we have found, that is seemingly useable for the now newly discerned southern form of the Fork-tail, is *plumbea.* This was allegedly a manuscript name, proposed by Peale and listed by him (U. S. Explor. Exped., vol. 8, Mamm. and Ornith., 1848, p. 292) as if a synonym of *Thalassidroma furcata* (Gmelin). The description given in the text applies quite as well to one race as the other. But this fact does not, in our judgement, preclude its resuscitation, when we take into account the circumstance that the only specimens Peale had before him "were obtained on the coast of Oregon." We therefore use Peale's name for the southeastern race, defining it as follows.

Oceanodroma furcata plumbea, new subspecies, though old name (Peale's).
Southern Fork-tailed Petrel.

Type.—Not known to be extant, if, indeed, ever designated; but before us is one of two "cotypes" contained in the United States National Museum, namely. no. 15461. The specimen is old, soiled, rag-

ged, taken down from a mount evidently long on exhibition. The only tag on it is of recent origin; written upon it in the handwriting of Charles W. Richmond, beside the number, are the following data: "Thalassidroma plumbea Peale .| Oregon. T. R. Peale. || Cotype!" Cassin, reporting in 1858 more fully on the "Mammalogy and Ornithology" of the U. S. Exploring Expedition, says (pp. 405, 406) that, on April 29, 1840, when in sight of the coast of Oregon (=Washington, close off Cape Flattery according to Wilkes, vol. 4, 1845, p. 296), one of the party, Dr. Charles Pickering, recorded encountering great numbers of the "Gray *Thalassidroma*," and "several specimens were taken with a hook and line." Thus we are provided with exact knowledge of place and date of capture of the type series of *plumbea*.

Diagnosis.—Similar to *Oceanodroma furcata furcata* but smaller, especially in length of wing and tail; general coloration darker (grayer or more plumbeous, less ashy or bluish); throat, lower abdomen, and crissum contrasting less with middle region of underparts by being wholly or in part grayer than in *furcata*.

Geographic range.—Breeds scatteringly on islands from coast of Humboldt County, northern California, north to Alexander Archipelago, on southern coast of Alaska just short of Cross Sound. We have breeding season series from near Trinidad, Humboldt County, California, and from near Sitka, Alaska. A hiatus in breeding range apparently exists between *plumbea* and *furcata* on the Alaskan coast between Cross Sound and the easternmost of the Aleutian Islands, whence (Akun Id., Akutan Id., Egg Id., Sanak Id.) come most of the specimens of *furcata* we have examined.

Measurements in millimeters

		Wing	Tail	Tarsus	Middle toe without claw	Culmen
Coast of Calif. May-August *plumbea*	2 ♂ ♂	143.1 (141.6-144.6)	79.5 (75.4-83.6)	25.6 (24.8-26.4)	22.5 (22.0-22.9)	14.1 (13.9-14.3)
	5 ♀ ♀	149.3 (146.2-154.8)	87.7 (85.2-89.8)	25.9 (25.6-26.2)	22.7 (21.9-23.9)	14.4 (14.2-14.8)
Sitka, Alaska July *plumbea*	11 ♂ ♂	151.4 (145.3-155.9)	86.5 (82.4-91.3)	26.2 (25.4-27.0)	22.5 (21.3-23.4)	14.6 (13.9-15.2)
	10 ♀ ♀	153.2 (149.9-156.1)	88.5 (82.6-96.5)	25.7 (24.4-27.5)	22.8 (21.3-24.0)	14.6 (13.9-15.3)
Aleutian Ids. June-August *furcata*	12 ♂ ♂	159.0 (154.7-165.0)	89.8 (82.3-96.0)	27.2 (25.5-28.6)	23.0 (21.6-24.5)	15.1 (14.4-16.1)
	15 ♀ ♀	159.6 (152.8-165.8)	93.2 (83.3-100.4)	27.3 (26.8-27.8)	23.8 (21.7-25.2)	14.9 (14.3-15.6)

Remarks.—In seeking information concerning a possible type specimen for Peale's name *plumbea*, we first looked in Witmer Stone's (1899) list of bird types in the Philadelphia Academy of Natural Sciences—without result. Then appeal was made to Mr. Wharton Huber, of the Philadelphia Academy, who could say only that, if there ever was a type there, it might have gone with other known types to P. T. Barnum, whose museum in Boston was subsequently burned. Enquiry of Dr. Herbert Friedmann, Curator of Birds in the U. S. National Museum, brought the information that no single specimen there has ever been designated as type, but that there are two of Peale's birds there that are marked "cotype"; one of these he kindly forwarded for our examination.

In the accompanying table of measurements, only specimens that were fairly certainly on or near their nesting grounds are included. McGregor (Condor, vol. 8, 1906, p. 117), collector of most of our northern material, mentions finding downy young in the Aleutian Islands on July 30; August-taken birds, therefore, had probably wandered little if at all from their breeding sites. However, the few specimens taken in September and October are omitted, as even "resident" petrels may wander considerable distances after nesting. It will be noted that a gradual decrease in size from the Aleutian Islands southward is indicated. The Sitka birds are more or less intermediate between *furcata* and *plumbea*, but average closer to the latter. Their coloration, likewise, is intermediate; some are nearly as light as *furcata* from the Aleutian Islands, others are dark like *plumbea* from the California coast. The average, however, is more nearly the color tone of the southern race.

There are at hand six specimens taken in Alaska in late September and October which are not included in the table of measurements. Of these, two from Unalaska Island and three labeled as from Russian Mission near the mouth of the Yukon River are clearly referable to *furcata*, though their coloration approaches that of the average of the Sitka specimens. A single specimen, taken September 18, 1908, in Prince William Sound has measurements and coloration agreeing in general with those of the southern race.

A female from Sanak Island, which lies somewhat east of the other Aleutian Islands from which the Museum of Vertebrate Zoology has specimens, approaches closely to *plumbea* in color, though its

measurements are clearly those of the northern race. The date of capture, June 30, indicates that it was probably on its breeding grounds, though there is a possibility of its being a non-breeding wanderer. One other individual deserves mention. This is a specimen shot in August in San Pedro Bay, California, by "Lorquin" (probably E. F. Lorquin, zoologist of San Francisco) and obtained by J. G. Cooper in exchange; Cooper's label bears no date nor sex indication. This bird, which constitutes one of the southernmost published records for the California coast, was probably a vagrant. It belongs to the southern race, though approaching *furcata* slightly in both size and coloration.

How far the petrels of this species from each breeding colony wander from season to season remains yet to be determined. It is to be expected that individuals return year after year to the islet on which they were raised, or at least to some nearby place; the geographic trends that are the subject of this paper bear out this hypothesis. By application of the banding method it would be possible to learn whether wandering birds eventually breed in a colony far distant from that in which they were raised, and also how general an interchange of individuals may occur from year to year between neighboring colonies. The ease with which the birds can be captured while nesting should make such a study practicable.—J. GRINNELL and FREDERICK H. TEST, *Museum of Vertebrate Zoology, Berkeley, California, November 28, 1938.*

Mountain Bluebirds Hovering.—While hunting jack rabbits at Cannon, Solano County, California, on February 13, 1939, I was much interested to observe Mountain Bluebirds (*Sialia currucoides*) hovering in the air in one spot in such manner as do Sparrow Hawks and White-tailed Kites. From fifteen to eighteen birds thus hovered at one time, legs dangling, tail spread and pointing downwards, and eyes searching the ground below. They were of course feeding and appeared successful in recovering their prey at each drop to the ground. These drops were from elevations of from ten to fifteen feet. They were not rapid plunges or dives such as made by hawks or falcons, but gentle flutters to the ground, where they alighted and snatched the prey with the bill.

Being inquisitive as to what attracted these birds, I took one specimen and found in the stomach three whole black ground beetles (*Amara insignis*) and a cricket (*Gryllus assimilis*). There were also many fragments representing other individuals of these same species, and segments of other beetles, mostly Carabidae, and of orthopterans. These insect identifications were made by E. Gorton Linsley of the Division of Entomology, University of California.—EMERSON A. STONER, *Benicia, California, March 22, 1939.*

Observations on the Reproductive Behavior of Great Blue Herons.—While visiting some nesting colonies of shore birds on the islands off the coast of the Arkansas Migratory Waterfowl Refuge near Austwell, Texas, I had the opportunity of witnessing a pair of Great Blue Herons in the act of copulation. The blistering hot sun and the ever present grackles made it dangerous for the birds to leave their nests unguarded for a single minute, so I concealed myself in the brush to cause as little disturbance as possible. Nests were numerous, on the ground, beneath bushes, in stunted trees, anywhere that an overhanging leaf or branch afforded a little shade during even a portion of the day. One nest in particular had commanded my attention because of its peculiar position in the very top of a dense growth of prickly pear. Upon it sat a female Great Blue Heron (*Ardea herodias*).

While thus hidden, I could observe the undisturbed birds at rest on their nests. Of particular interest was the method by which the male and female egrets and herons exchanged places on their nests. Usually the female remained on the nest until the male was flapping directly overhead, and then the sitting bird left and its mate took its place. When the male blue heron came upwind and hovered directly over its sitting mate, I expected the female to leave and the male to replace her. To my surprise, the male slowly settled down facing the same direction as the female with feet clasping the edge of the nest close to the female's neck. With wings slowly flapping to maintain his balance, the male flexed his legs and lowered his body to meet the now rising female. In this position the act of copulation took place, after which the male flew away and the female settled down to protect her eggs.

Now that I have had time to think over the observation, I am wondering whether this is the usual manner of copulation for the long-legged wading birds, or whether the hot sun and the presence of the grackles made this method necessary.—F. WALLACE TABER, *Texas Agricultural and Mechanical College, College Station, Texas, May 8, 1939.*

Notes on the Salt-feeding Habits of the Red Crossbill.—During the latter part of July and August of 1938, crossbills (*Loxia curvirostra*) were found abundantly in flocks in the higher portions of Crater Lake National Park, Oregon. The increase of this species at this time in the rim area of the

park was coincident with the maturing of the cones of the white-bark pines and mountain hemlocks which served as a source of food for several species of birds. Often when feeding on the cones of these trees, large flocks of fifty or more crossbills (occasionally accompanied by a few Cassin Purple Finches and Pine Siskins) were seen to fly, seemingly without provocation, in a somewhat erratic flight to cliff faces of andesite or pumice. In all instances the birds flew only to those parts of the formation having a whitish or pink-colored surface. These light spots were found to consist of a powdery crust, probably made up of calcium salts dissolved from the rock material. The crust was usually not more than one-sixteenth of an inch in thickness and could be loosened easily with the finger nail. The faces of certain cliffs in a huge road cut on the side of Watchman Peak and parts of the eroded walls of "The Pinnacles" formation at Sand Creek are well supplied with such crusts and form a regular foraging ground for those members of the finch family that seemingly require salts in their diet. The crossbills visit the cliffs more than the other two species mentioned and are more easily watched. Careful approaches to within twenty feet of the birds were made and the actions observed for some time.

Sometimes the crossbills flew back and forth to the cliffs from a convenient perching tree nearby. If suitable perching places were present on the cliffs from which to take the salt, the length of time that the flock would stay was half an hour or more. In all types of foraging, however, the salt feeding process seems to be a slow one with deliberate movements predominating.

On nearly vertical and relatively smooth faces two types of positions were observed. By far the most frequent position assumed was that resembling a woodpecker's. The crossbills would fly to the cliff face and with some difficulty gain a foothold with the claws, depressing the tail and thus sustaining a vertical position on or beside a salt patch. Usually a pause of a few seconds was made prior to feeding on the salt, and then the slow methodical movements were begun. Since they can pick up nothing small with the crossed tips of the bill, they placed the head sidewise against the crust. The bill was then opened widely and the tongue was slowly moved in and out and the salty crust "licked off" with the side of the tongue. The tongue was distinctly reddish in bright sunlight and seemed unusually large for the size of the bird. This is probably a necessity in order to manipulate certain foods under the handicap of the crossed mandibles. Frequently the birds were seen to loosen the salt crusts by picking at them; then followed the usual sideward licking process.

Another salt-foraging position was similar to the upside down position of a nuthatch. This method of perching on a nearly vertical cliff surface was seen to be a result of downward pivoting from the woodpecker position. One bird in this pose was seen to have its lower mandible inserted in a notch in the rock to prevent slipping downward head first; all the time while in this position the tongue was at work.

Beside foraging on cliffs, crossbills were seen to peck at finely fragmented rocks on talus slides.—ELMER C. ALDRICH, *Oakland, California, May 15, 1939.*

NOTES AND NEWS

On May 29, 1939, came word of the passing of our editor and eminent leader of ornithology in western North America, Joseph Grinnell. This issue of the Condor was on his desk, the editing of it nearly finished. For thirty-four years the Condor was his continued responsibility. His tireless effort, his search for improvements and the guiding influence of his editorial criticism, applied throughout most of the history of the journal, are largely responsible for its scientific and literary standing. We who lately have been privileged to work with him can but marvel at his sustained enthusiasm in his editorial tasks. There is no serious student of vertebrate animals in North America that needs to be reminded of Joseph Grinnell's accurate and prodigious contribution to our literature and to his building of the Museum of Vertebrate Zoology as a research institution. Of his personal attributes, only a few can be singled out here in this brief notice as impressing us most forcefully. As we perceived his philosophy, the thing that seemed to him of most lasting value was the published record of research. Writing was his natural outlet, his mode of expression. Yet, the great number of his warm friendships were fostered by no means solely through his extensive correspondence. In conversation he generously gave of his time, listened sympathetically and freely contributed from his great fund of information. Without any overt expression, one soon felt a reserved but wholly genuine personal attachment. He did not in the slightest way presume upon the respect and affection which his associates held for him. He was one who did things and sought no special recognition for it, who avoided time consuming honorary functions because there was so much interesting and valuable work to be done. One of his remarkable qualities in late years was youthfulness of mind, involving the ability to change his views and to criticize his earlier ideas and conclusions. This drew younger persons to him; they admired him, and in turn he relied on them. This was the man, the stimulating teacher, idealist and leader, who is lost to us while still active in the work which only he could do so well.—A.H.M.

According to a report by C. W. Lockerbie in this issue of the Condor (p. 170), starlings have now appeared in Utah. It seems that invasion of the Pacific Coast area is imminent. Much as we may regret the anticipated arrival of these birds, there is nothing that can be done to prevent it. Our one consolation is the opportunity we will have to record the way in which an invading species establishes itself. Much may be learned of biological importance if every person interested in birds in the areas now free of starlings records in fullest detail the circumstances connected with the invasion. Not only the first arrival should command attention, but the many adjustments in populations of starlings and of other birds which will follow the pioneering period should be carefully noted. It will be some time before starlings reach a state of equilibrium in the West, and every shred of information pertaining to their natural history should be gathered during that time. When the English Sparrow spread westward, bird observers were much less numerous than at present and a rather incomplete picture is left us of the details of their dispersal. Will we do better on the starling problem? We are indebted to Dr. Lawrence E. Hicks, who is studying starlings in the Middle West, for recalling to mind our strategic position for the future study of this species.—A.H.M.

A concluding statement in the Wildlife Research and Management Leaflet of the United States Biological Survey, January, 1939, by Ralph H. Imler and E. R. Kalmbach is quoted below. The subject of their report is crow damage in Oklahoma, but their conclusions carry implications of a general nature. "Comparison of data obtained from the field with those from questionnaires was possible in one county ... and it revealed that estimates of the percentage of crops lost was about 6 times, and of financial losses, 16 times greater in the returns from questionnaires than in the data obtained from field appraisal. Estimates of numbers of crows (complicated by the fact that the questionnaire returns may have included duplicate counting of roosts and groups of crows) also were higher in the questionnaire returns. On the whole the study again brought out the fact, long known to economic ornithologists, that the more or less casual appraisal of crop losses by their owners is almost certain to be exaggerated. Some of this is due to that most characteristic of human traits, a tendency to overestimate one's misfortunes. The graphic recollection of the worst experiences encountered, and possibly a none too accurate appraisal of damage in the first place, also may tend to aggravate the seriousness of by-gone events."

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MARCH.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 16, 1939, at 8:00 p. m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and sixty-six members and guests present. Minutes of the Northern Division for February were read

and approved. Names proposed for membership were: Mrs. Aniva H. Bobbert, 308 Chestnut Avenue, Palo Alto, California; Jerome Chester Draper, Jr., Tudor Drive, Menlo Park, California; Miss Marion Jo Theobald, Route 1, Box 533, Palo Alto; Mrs. Sarah Jane Trumbo, 636 Melville Avenue, Palo Alto; all these names submitted by Harry R. Painton. Miss Winifred M. Smith, 46 Mace Street, Piedmont, California, was proposed by Junea W. Kelly.

It was announced that the conservation committee would appreciate suggestions concerning its work, and members were urged to forward any ideas which they might have, to the committee members.

Mr. Emlen opened field notes with an account of some 150,000 ducks which had been seen for nearly a month, flying over Davis regularly on their way back and forth from daytime resting pools in the by-pass country to night-time feeding grounds in rice stubble fields 22 miles away. Mr. Alden Miller described the fighting of a Downy Woodpecker "triangle" on a telephone pole. These birds perched lengthwise of the wires, using the tail for support. Mr. Sibley reported Townsend Solitaires at Nortonville, March 5. On March 12, Hooded Mergansers were seen by him near Walnut Creek and a White-tailed Kite near Pittsburg, Contra Costa County. Mr. Mowbray had seen a Black-throated Gray Warbler at Fairfax, Marin County, on March 12. He had recorded the first Cliff Swallow, March 15, at the Life Sciences Building. Mr. David Nichols had been watching Savannah and Song sparrows at the San Mateo Bridge and stated that he desired information on the singing postures of different birds. Mrs. Allen had noted 30 Crossbills near her home in Berkeley. Mr. Alden Miller had seen a Townsend Solitaire not far from his home and had had report of another near Cowell Hospital. Mr. Emlen reported Evening Grosbeaks at Knight's Landing, Yolo County.

Mrs. G. Earle Kelly contributed the main part of the program, an account of "Nesting Activities on the Tundra at Churchill." Lantern slides illustrated descriptions of the landscape, the tundra appearing like upholstery. The journey was not without its trials and tribulations, and cabin accommodations gave shelter from weather which ranged from freezing to very warm and back again with startling rapidity. The bay shores make up a habitat of rocky ledges, gravel beds and mud flats with many little pools. The sedge-covered tundra provides tundra pools. The birds usually have flight songs because of the lack of perches. Upon Mrs. Kelly's arrival, the Horned Larks already were nesting, while the Longspurs were only singing. About 142 bird species are to be found at Churchill, and of these Mrs. Kelly saw 72. The birds are not concentrated in migration as they are here. The first goslings came out on June 16. Ten species of ducks nested in the vicinity; the Old-squaw was commonest. Parasitic and Long-tailed jaegers were seen harrying the Arctic Terns and the Bonaparte and Herring gulls. The Semipalmated Plover is known as the "bat" in the vernacular, and the snipe is called the "frozen bird" because it sounds like a person shivering. Sandpipers comprised five species. Passerine birds included four species of warblers, Gray-cheeked Thrush, Robin, Canada Jay, Rusty Blackbird, Tree Swallow and many species of sparrow. The only hawks present were the American Rough-legged Hawk, Marsh Hawk and Duck Hawk. The bright reds and browns of the shore-birds harmonize perfectly with the ruddy color of tundra plants. Mrs. Kelly concluded her talk with lantern slides of tundra nests.

Adjourned.—CHARLES SIBLEY, *Acting Secretary.*

APRIL.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, April 27, 1939, at 8:00 p. m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and fifty-two members and guests present. Minutes of the Northern Division for March were read and approved. Minutes of the Southern Division were read by title. Names proposed for membership were: David Gelston Nichols, 1713 Dwight Way, Berkeley, California, by Kathryn Buchanan; James D. Stokes, Library, Division of Fish and Game, Ferry Building, San Francisco, by Bessie W. Kibbe; Granville Wood, 2000 El Camino Real, Palo Alto, California, by Harry R. Painton.

As representing the conservation committee, Mr. Elmer Aldrich reported on a recent meeting in Oakland of the American Wildlife Institute, sponsored by the Junior Chamber of Commerce and attended by sportsmen, sports writers, taxidermists, Biological Survey officials, and members of Audubon Societies and other groups. The principal speaker was Mr. Joseph Hunter, of the California Fish and Game Commission, who outlined the nature and scope of that commission's work.

Mr. Joseph Dixon had observed an American Egret eating meadow mice on a dry pasture in San Diego County, a habitat far from water. Mr. Emlen urged members to watch for any possible effects of the current dry season on bird life. Miss Stedman had already noticed that the large flocks of Cedar Waxwings frequenting her garden in Oakland seemed pleased with apples as food, perhaps because of the juice. Interesting photographs which she had taken of the Waxwings on a window feeding tray were displayed at the close of the meeting. Mr. Cain gave as records for the Boy Scouts' Dimond Camp, a

Townsend Solitaire, April 15, a Bullock Oriole, April 17 (only the second record in 17 years), and Golden-crowned Kinglets, April 22. Mr. Kinsey reported a Townsend Solitaire in Marin County, not traceable to any which might have escaped from his aviaries. He inquired as to whether there were any nesting colonies of Purple Martins within 100 miles of the bay region. Mr. Emlen thought that certain colonies in the Sacramento Valley would come within that radius. There was discussion, initiated by Mr. Kinsey, of the possible effects on birds of eating poisoned grasshoppers in the San Joaquin Valley "plague" areas. Mr. Emlen stated that Mr. Johnson Neff, of the United States Department of Agriculture, had no definite information but believed the damage to be slight. Mr. Twining pointed out that strychnine, if that is the poison used, does not affect gallinaceous birds. Various entomologists were quoted by members to the effect that the newspaper accounts of the grasshopper invasions have been greatly exaggerated.

Mr. Elmer Aldrich spoke on "The Natural History of the Allen Hummingbird," using his own photographs as illustrations. He mentioned some of the difficulties in distinguishing between the Allen and the Rufous hummers in the field. Specialized flights, and the relation of contour and position of wing and tail feathers to sounds produced, were vividly explained by means of blackboard sketches. Many types of nests and nesting sites were shown on the screen, and a series of growth studies was presented of a young bird taken daily from the nest and photographed. Trays of specimens, including some of the large and brilliantly colored tropical species, and many types of nests, furnished interesting displays for the conclusion of the meeting.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

SOUTHERN DIVISION

FEBRUARY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum on Tuesday, February 28, 1939, at 8 p. m., with President Peyton in the chair and about sixty members and guests present. The minutes of the Southern Division were read and approved. The following applications for membership were read: Robert B. Sanders, 417 South Holliston Ave., Pasadena, California, proposed by Kenneth Stager; C. Selwyn Rich, 114 Charpin Place, Alhambra, California, by W. Lee Chambers; and Mrs. Edna Elden Williams, Posey Star Route, Bakersfield, California, by Mrs. N. Edward Ayer. The secretary announced that Mr. Sidney Platford had tickets for sale for a lecture with motion pictures to be given by Mr. Robert T. Moore on April 19 under the auspices of the California Audubon Society's "Save the Condor" fund.

The speaker of the evening, Mr. Raymond B. Cowles, gave an interesting discussion of the association of phainopeplas and desert mistletoe. In the winter these birds are found feeding on the mistletoe berries. The pulpy material is digested, while the seeds are either regurgitated or defecated. Dropping on to the twigs of the host tree, they adhere and may start new plants. The mesquite trees which are the most frequent hosts exude a gum under the seed, pushing it up away from the branch. In this way, adherence of the new plant is sometimes prevented. Another possible natural check is postulated in the breaking off of the seeds by rodents running over the trees.

Mr. Cowles accompanied his talk with colored slides and an exhibit of mistletoe seed in various stages of development. Following the main subject, the speaker showed a series of colored slides of desert reptiles in which the natural coloring of these often inconspicuous animals was shown to excellent advantage.

Mr. Peyton announced that Mr. Alfred M. Bailey would be able to speak at the next meeting of the Southern Division, if the date could be postponed until April 3. A motion for such postponement was made, seconded and unanimously carried.

Adjourned.—HILDEGARDE HOWARD, *Secretary.*

MARCH.—The March meeting of the Southern Division of the Cooper Ornithological Club was postponed until Monday, April 3, 1939, in order to make possible the program of the evening. The meeting was held at the Los Angeles Museum, Exposition Park, with about 100 members and guests present and Mr. Peyton presiding. The minutes of the Southern Division for February were read and approved. One application for membership was read: Mrs. Ruthven Deane, 830 Hibbard Road, Winnetka, Illinois, proposed by W. Lee Chambers. The secretary read an announcement, from the John Muir Association, of a bird walk and supper at the Wistaria Vine Gardens, Sierra Madre, on April 21 at 6:30 p. m.

The speaker of the evening, Mr. Alfred M. Bailey, showed several reels of motion pictures dealing with wild life. The first subject, "Along Audubon's Labrador Trail," dealt with Mr. Bailey's trip over the route taken years earlier by Audubon, and included exceptionally good views of the native birds, many of them nesting. The second subject, "Colorado Wild Life," showed other excellent photographs of nesting and close views of the Sage Grouse dancing. A reel on the Golden Eagle, pictured from a good point of vantage, showed the parent eagle feeding the young in the nest. The last reel, in color, showed views of Yellowstone National Park and included an outstanding sequence of a bull moose in its natural habitat.

Adjourned.—HILDEGARDE HOWARD, *Secretary.*

For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of The Condor free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN McB. ROBERTSON, Buena Park, California.

BIRD REFERENCE work of any kind done at the U. S. National Museum for distant ornithologists. I have full access to the collections and library. Terms: 50 cents per hour. Address: DR. E. M. HASBROUCK, *U. S. National Museum, Washington, D. C.*

FOR SALE—For a fair cash offer. Twelve years of the Wilson Bulletin, 1921 to 1932 inclusive, bound in four library buckram volumes.—FRED J. PIERCE, *Winthrop, Iowa.*

FOR SALE—The following odd numbers of The Condor at twenty-five cents each: vol. 3, no. 4; vol. 4, no. 1; vol. 7, no. 4; vol. 10, no. 6; vol. 15, no. 2; vol. 16, no. 3; vol. 34, no. 4; vol. 23, no. 1; and vol. 29, no. 1. Also vol. 27, no. 1 at fifty cents.—W. L. BAILEY, *Ardmore, Pa.*

FOR SALE—A few remaining copies of "A Guide to Colorado Birds" by W. H. Bergtold, late Fellow of the A.O.U., 1928, out of print, 207 pages. New, cloth, postpaid, $2.10.—HUGO G. RODECK, *University of Colorado Museum, Boulder, Colorado.*

WESTERN BIRD-BANDING ASSOCIATION

Modesto Funnel Trap, 24" x 24" x 8½"; in the United States,
west of Mississippi River..... $4.50 postpaid

East of the River, and in Canada..... $5.00 postpaid

W. B. B. A. Government Sparrow Trap, 14" x 28" x 10"; in the United States,
west of Mississippi River..... $4.50 postpaid

East of the River, and in Canada..... $5.00 postpaid

W. B. B. A. One-cell Trap, 7" x 11½" x 8"; in the United States,
west of Mississippi River..... $1.25 postpaid

East of the River, and in Canada..... $1.40 postpaid

W. B. B. A. One-cell Trap, 5" x 7½" x 8"; in the United States,
west of Mississippi River..... $1.00 postpaid

East of the River, and in Canada..... $1.15 postpaid

W. B. B. A. Warbler Trap, 8½" x 15½" x 9½"; in the United States,
west of Mississippi River..... $3.00 postpaid

East of the River, and in Canada..... $3.25 postpaid

Rogers Two-V-cell Trap, 8" x 8" x 8"; in the United States,
West of Mississippi River..... $1.50 postpaid

East of the River, and in Canada..... $1.75 postpaid

Address: MR. WALTER I. ALLEN, 2057 Pepper Drive,
Altadena, California.